TRANSACTIONS

OF THE

N. Y. State Agricultural Society,

WITH AN

ABSTRACT OF THE PROCEEDINGS

OF THE

COUNTY AGRICULTURAL SOCIETIES.

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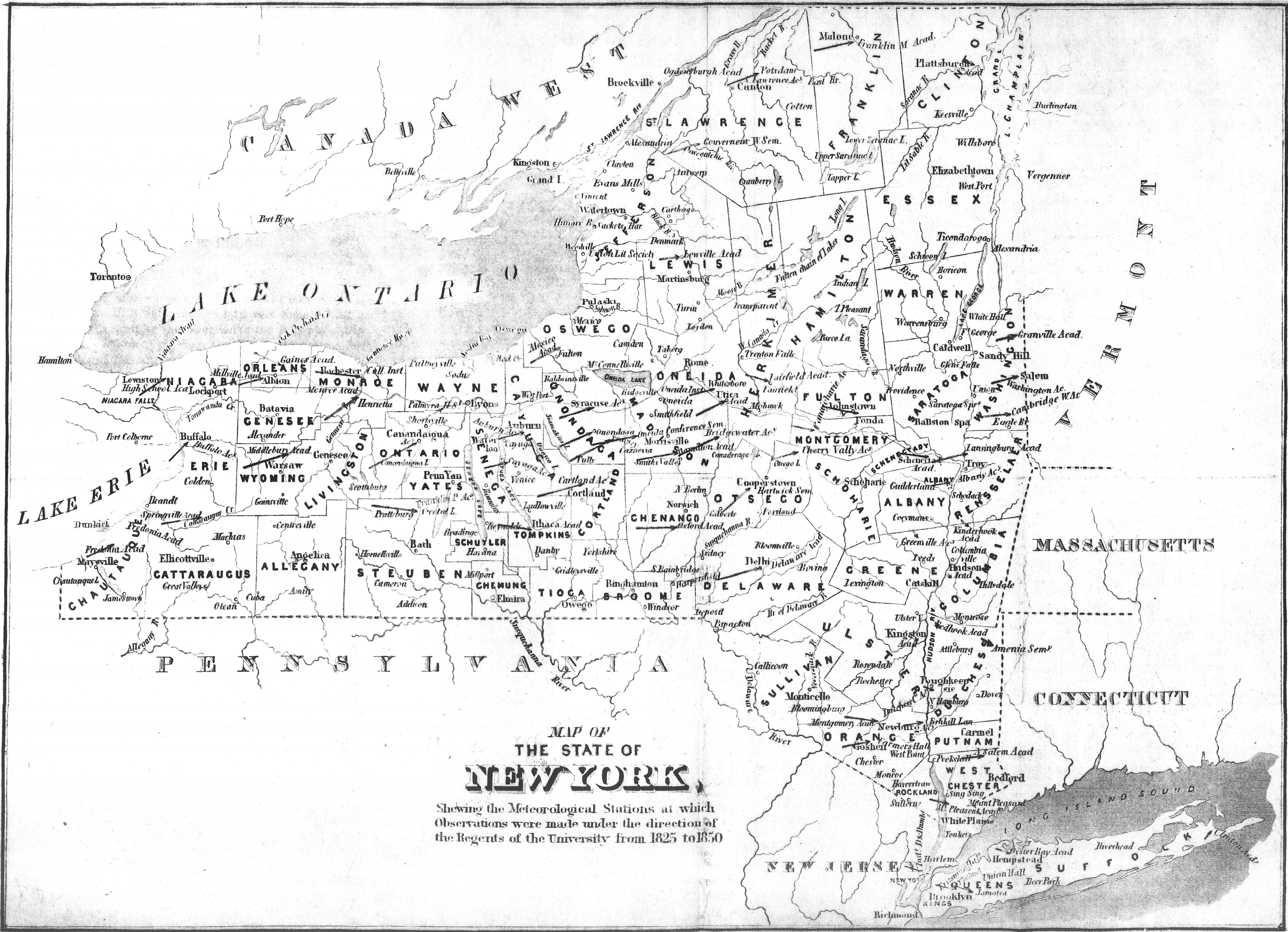


MAP OF
THE STATE OF
NEW YORK,
Shewing the Meteorological Stations at which Observations were made under the direction of the Regents of the University from 1825 to 1850

ESSAY

ON THE

CLIMATE OF THE STATE OF NEW-YORK.

BY FRANKLIN B. HOUGH.

The completion of a summary of meteorological records, made at sixty-two different academies in this State during a quarter of a-century, under the direction of the Regents of the University,* has afforded the opportunity of presenting the practical results of this extensive and long-continued system of observations, and of drawing therefrom a series of generalizations with reference to its bearing upon the operations of agriculture and the useful arts.

The application of meteorological science to the explanation of its influences upon vegetable and animal life, and the strict dependance of the husbandman upon the genial return of the seasons, and auspicious succession of cold and heat, of sunshine and showers, for the fulfilment of his hopes, has long been recognized, and every discovery in the laws which govern our climate is to him an important acquisition. Although we may not be able to modify, or in the slightest degree vary these changes, yet by a careful comparison of observations, made at many stations, through long periods, we may arrive at a knowledge of this probable succession in the future; be able, in some instances, to foretel disastrous changes in time to prepare for them, and so to plan our operations as to secure the greatest advantages attainable.

* "Results of a series of Meteorological Observations made in obedience to instructions from the Regents of the University, at sundry academies in the State of New-York, from 1825 to 1850 inclusive. Compiled from the original returns, and the annual reports of the Regents of the University. By Franklin B. Hough, A. M., M. D., Corresponding Member of the New-York Historical Society. Published by Legislative Authority. Albany: Weed, Parsons & Co., Printers, 1855." 4to. pp. 502, with map and diagrams.

From necessity, spending much of his time in the open air, and an interested observer of atmospheric changes, the farmer seems peculiarly favored for the study of meteorology, and a concerted and intelligent course of observation by agriculturists throughout the State, would add much to our knowledge of the general features and local variations of our climate. Such a plan has been recommended by the State Agricultural Society to its members, and merits the most careful attention.

The accompanying map exhibits the location of the several stations at which observations were made during the period embraced in the series under consideration, the arrows at each indicating by their direction the prevailing course, and by their length the relative amount of winds at each. The head of the arrows represents the place of the station.

The observations made at academies, as above mentioned, consisted of a record of the thermometer thrice daily; of the wind and aspect of the sky in the forenoon and afternoon, and of the depth of rain and snow, with notices of haloes, auroras and meteors, the progess of vegetation, the arrival and departure of birds of passage, unusual atmospheric phenomena, and such other memoranda as might serve to mark the relative forwardness of the seasons, or preserve some interesting fact in physical science. The temperature was directed to be noted in the morning before sunrise, for the coldest period in the day, between two and four o'clock in the afternoon, for the warmest, and an hour after sunset. The mean was obtained, by adding to the morning observation twice the afternoon and twice the evening observation with that of the next morning, and dividing their sum by 6.*

The thermometers first supplied to academies were made by Mr. Kendall, of New Lebanon, and the graduation was that of Fahrenheit. They were directed to be placed in a situation where there was a free circulation of air, and screened from the direct or reflected rays of the sun, and as far as practicable from the radiations of neighboring bodies.

Twice during each day the temperature is that of the mean, and a single observation then made would give this element; but these periods are found to vary greatly, and to occur at a time

* The arithmetical mean of the daily observations, and the mean obtained by the above rule, were both given for the Albany station during four years, by the late Dr. T. Romeyn Beck, with the view of arriving at the comparative accuracy of the two methods. The result showed that the rule adopted gave about one-third of a degree higher than the other.

when the temperature is changing most rapidly. The periods of daily maximum and minimum are most constant, but are still very liable to be influenced by direction of the wind and aspect of sky. They generally occur earlier in winter than in summer, and in climates where sea breezes prevail, the greatest heat often occurs before noon.

The State of New-York, extending over a hundred miles along the sea coast, and stretching to the great lakes, presenting every variety of surface, from alpine peaks to level sandy plains, exposed to the breezes of the Atlantic and the chilling but bracing winds of the north, may be supposed to present all the modifications of climate which these varied circumstances can produce. Hence we observe that the mean temperatures of stations where observations have been made, vary from 42 to 51 degrees, with an extreme range of 145 degrees; the mean direction of the wind, from a point N. 54 W. to S 84 degrees E., through every intermediate point of west and south; the force of the wind, from 3 to 59 per cent, and the mean annual depth of rain from 22 to 46 inches.

The blossoming of plants, and other harbingers of spring, occur from two to three weeks earlier on Long Island, than in the northern and western parts of the State, while in the latter, the first frosts and snows indicating the approach of winter, are seen nearly a month sooner. The progress of vegetation in midsummer, as indicated by the harvests, is found to vary but little, thus indicating the more rapid progress of vegetation in the colder sections of the State, and an approach to the short and hot summers of polar climates. It is noticed, that the first appearance of birds of passage in the southern and northern parts of the State, is much more uniform than the flowering of plants, the extreme interval of first appearance seldom exceeding a week.

As the earth is enveloped by the atmosphere, which is highly elastic, and easily displaced by slight changes of temperature, and as it is influenced both by astronomical and local causes, it is obvious, that we must go beyond the limits of a State, in the investigation of its general laws, and take into account the influences of oceans and lakes, of arid sands, woodlands and mountains, vallies and plains, in their unequal capacity for absorbing or reflecting solar heat, affording moisture by evaporation, or modifying the direction and velocity of winds. Were the earth's surface *uniform*, it is probable

that changes in the atmosphere would occur with the same regularity as day and night, and hence, it becomes highly important, to study the modifying effects of local causes, and take into account their influences in producing permanent or occasional conditions of climate.

Altitude, is found to exert a much greater influence, other circumstances being equal, than geographical position; and it is a familiar fact, that in mountainous regions under the same parallel within the tropics, one can meet with every vicissitude of climate that is known. The temperature diminishing as we ascend, at an elevation of a few thousand feet in our latitude, in summer, reaches the point of congelation, which is constantly fluctuating with the seasons, and the alternations of day and night; often descending to the earth's surface in winter, and making its monthly and almost weekly visits to the peaks of our mountains throughout the year.

The direction of winds, and other causes, so essentially vary the decrease of temperature in highlands, that no definite rule can be given for determining it, but the results of observations in this State, show a striking difference of mean temperature, between places similarly situated except in altitude, which can be ascribed to no other cause. A comparison of Onondaga and Pompey; of Utica or Whitesboro, and Bridegwater, Hamilton or Fairfield; of Newburgh and Goshen, or of Poughkeepsie and Amenia, in the accompanying tables, will illustrate this point. It will also be noticed, that all the stations on Long Island, and in the valley of the Hudson as far as Lansingburgh, have a mean temperature above that of the State, while with eight exceptions,* those situated in the central, western, and northern sections, have a mean below the general average.

Extremes of temperature become *less*, as the mean is *higher;* the annual extremes of seventeen stations which were less than 100 degrees, having with a single exception, a mean above that of the whole State. Of twenty-two stations at which the mean annual range is below that of the State, all but one, are in the vicinity of lakes or large rivers.

The temperature of the months, is observed to increase from the first half of February, to the last half of July, the mean of the second half of April and of October, being nearly that of

* Cayuga, Prattsburgh, Fredonia, Lewiston, Mexico, Onondaga, Rochester and Syracuse. Most of these are in the vicinity of lakes or other bodies of water which exert an equalizing effect upon the country around them.

the year. The distribution of heat through the several months, is shown by the following table, which embraces the entire period and all the stations reporting:

Months.	1st half.	2d half.	Whole month.
January,	25°.17	24°.19	24°.68
February,	21 .68	26 .59	24 .11
March,	31 .02	35 .86	33 .44
April,	43 .05	47 .58	45 .30
May,	53 .37	59 .06	56 .21
June,	63 .71	67 .49	65 .60
July,	69 .12	70 .23	69 .67
August,	69 .94	66 .99	68 .46
September,	62 .14	57 .60	59 .87
October,	50 .49	46 .05	48 .27
November,	41 .24	34 .11	37 .67
December,	29 .19	25 .30	27 .24

The station having the highest annual mean was Erasmus Hall, (Flatbush,) and that having the greatest range of temperature was Gouverneur.

The results of temperature throughout the State, are shown by the following table, which also exhibits a complete list of the stations, their location, elevation above tide, and the number of years in which the thermometer was observed. The aggregate period observed was 773 years.

TABLE *showing the names and locations of Academies at which observations were made, with their elevation above tide, period of observation and temperature.*

ACADEMIES AND THEIR LOCATION.	Elevations above tide.	No. of years observed.	THERMOMETER. Mean temperature.	Highest degree.	Lowest degree.	Extreme range.	MEAN RANGE. Monthly.	Annual.
	Feet.							
Albany—Albany county,	130	24	48°.60	97°	—23°	120°	67°.5	100°
Amenia Seminary—Dutchess county,	540	1	46 .73	96	—16	112	45 .5	112
Auburn—Cayuga county,	650	22	46 .62	96	—14	110	68	96
Bridgewater—Oneida county,	1, 286	4	42 .66	94	—31	125	70 .5	112
Buffalo—Erie county,	623	2	46 .14	92	—22	114	55 .5	114
Cambridge—Washington county,	....	14	45 .39	98	—36	134	74 .2	116
Canajoharie—Montgomery county,	284	3	45 .77	97	—36	133	62	118
Canandaigua—Ontario county,	707	10	45 .73	94	—11	105	62	96
Cayuga—(Aurora) Cayuga county,	447	13	49 .16	96	—10	106	63 .2	94
Cherry Valley—Otsego county	1, 335	15	44 .27	98	—30	128	73	105
Clinton—(E. Hampton) Suffolk county,	16	17	48 .74	95	— 8	103	61 .5	88
Cortland—(Homer) Cortland county,	1, 096	18	44 .67	95	—28	123	71 .5	105
Delaware—(Delhi) Delaware county,	1, 384	2	46 .66	93	—17	110	59	110
Dutchess—(Poughkeepsie) Dutchess county,	....	16	50 .61	102	—22	124	73	106
Erasmus Hall—(Flatbush) Kings county,	40	24	51 .62	96	— 4	100	59 .5	87
Fairfield—Herkimer county,	1, 185	19	43 .26	96	—26	122	72 .3	105
Farmers' Hall—(Goshen) Orange county,	425	11	47 .56	98	—30	128	69 .8	102
Franklin—(Malone) Franklin county,	703	3	43 .54	94	—24	118	65	109
Franklin—(Prattsburgh) Steuben county,	1, 494	10	49 .43	100	—19	119	71	106
Fredonia—Chautauque County,	728	18	48 .38	97	—12	109	65 .8	93
Gaines—Orleans county,	426	4	46 .71	94	— 7	101	57 .5	94
Gouverneur—St. Lawrence county,	400	12	43 .95	100	—40	140	79 .8	123
Granville—Washington county,	....	14	45 .39	102	—31	133	74 .5	117

List of stations and their results of temperature throughout the State.—(CONTINUED.)

ACADEMIES AND THEIR LOCATION.	Elevations above tide.	No. of years observed.	THERMOMETE					
			Mean temperature.	Highest degree.	Lowest degree.	Extreme range	MEAN PANGE. Monthly	Annual.
	Feet.							
Greenville—Greene county,	....	1	48°.05	91°	—17°	108°	51 .5	108
Hamilton—Madison county,	1,127	17	44 .82	96	—34	130	77 .5	112
Hartwick—Otsego county,	1,100	16	46 .54	96	—30	126	71	104
Hudson—Columbia county,	150	17	47 .84	99	—24	123	67 .8	102
Ithaca—Tompkins county,	417	17	48 .38	98	—18	116	70 .5	101
Johnstown—Fulton connty,	688	14	44 .91	96	—30	126	72 .3	112
Kinderhook—Columbia county,	126	17	47 .00	102	—30	134	74 .5	109
Kingston—Ulster county,	188	19	49 .57	100	—30	130	71	104
Lansingburgh—Rensselaer, county,	30	20	47 .92	101	—28	129	74	114
Lewiston—Niagara county,	280	17	47 .88	97	— 6	103	65 .3	92
Lowville—Lewis county,	800	19	43 .62	100	—40	140	79	120
Mexico—Oswego county,	331	11	49 .08	99	—24	123	72	106
Middlebury—Wyoming county,	800	19	46 .78	100	—20	120	78	103
Millville—Orleans county,	....	8	46 .11	95	—12	107	65	99
Monroe—(Henrietta) Monroe county,	600	3	45 .84	96	— 9	105	60	97
Montgomery—Orange county,	....	13	48 .60	104	—33	137	77 .5	109
Mount Pleasant—Westchester county,	125	12	47 .41	97	— 8	105	58 .5	93
Newburgh—Orange county,	150	18	97 .67	105	—15	120	69	100
New-York Institute Deaf and Dumb,	50	6	51 .01	92	— 2	94	49	84
North Salem—Westchester county,	361	19	48 .06	102	—31	133	74	105
Ogdensburgh—St. Lawrence county,	280	1	43 .48	92	—10	102	44	102
Oneida Conference Seminary—(Cazenovia) Madison county,	260	19	43 .65	97	—28	125	74	109
Oneida Institute—(Whitesboro') Oneida county,	405	7	44 .83	98	—33	131	71 .8	115
Onondaga—(Onondaga Hollow) Onondaga county,	600	16	47 .18	99	—22	121	72 .8	106
Oxford—Chenango county,	961	16	44 .74	98	—36	134	76 .3	114

Oyster Bay—Queens county,	....	2	50 .81	95	— 3	92	48 .2	90
Palmyra—Wayne county,	....	1	45 .33	93	— 9	102	54	102
Plattsburgh—Clinton county,	120	5	45 .17	100	—20	120	63	108
Pompey—Onondaga county,	1,300	17	42 .83	91	—18	109	66	99
Redhook—Dutchess county,	....	12	48 .36	98	—28	126	68	102
Rochester—Monroe county,	506	19	46 .79	102	— 9	111	67	95
St. Lawrence—(Potsdam) St. Lawrence county,	394	31	43 .61	96	—34	130	78 .3	114
Schenectady—Schenectady county,	....	3	45 .82	91	—16	107	55 .3	101
Springville—Erie county,	1,082	7	45 .32	95	—20	115	69 .2	102
Syracuse—Onondaga county,	400	1	47 .30	94	— 3	97	45	97
Union Hall—(Jamaica) Queens county,	....	25	49 .87	100	— 7	107	64 .2	92
Union Literary Society—(Bellville) Jefferson county,	400	9	45 .51	98	—35	133	74 .5	112
Utica—Oneida county,	471	22	45 .38	97	—27	124	75	104
Washington—(Salem) Washington county,	....	10	46 .53	100	—40	140	73 .8	119
Mean,	....	....	46° .74	....	....	....	67°	103

TABLE *showing the Temperature at each station by months.*

	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Albany,	24°.37	24°.72	35°.03	47°.74	60°.06	68°.12	72°.24	70°.17	61°.38	49°.48	37°.16	28°.40
Amenia,	21 .79	20 .12	35 .56	41 .54	56 .67	66 .55	69 .34	67 .86	57 .76	46 .99	45 .15	28 .24
Auburn,	24 .37	24 .63	33 .47	45 .26	54 .39	63 .56	69 .84	68 .18	59 .44	48 .22	47 .75	29 .54
Bridgewater,	20 .64	21 .87	29 .88	42 .29	52 .98	69 .58	66 .63	62 .90	55 .44	44 .66	31 .42	23 .67
Buffalo,	23 .43	21 .13	35 .48	40 .70	55 .28	67 .44	61 .54	69 .98	64 .39	48 .75	37 .21	22 .84
Cambridge,	22 .44	21 .45	32 .69	44 .19	55 .27	64 .82	68 .88	66 .09	58 .29	46 .76	36 .56	28 .51
Canajoharie,	20 .97	19 .61	30 .46	47 .29	58 .33	64 .06	70 .34	67 .36	58 .69	49 .06	37 .87	25 .26
Canandaigua,	23 .34	21 .09	31 .84	45 .94	55 .92	65 .70	69 .48	66 .81	57 .32	47 .85	36 .14	26 .68
Cayuga,	28 .69	28 .18	36 .91	46 .59	56 .55	66 .15	72 .27	70 .71	62 .96	50 .52	40 .52	29 .80
Cherry Valley,	22 .03	21 .66	30 .30	43 .64	53 .84	63 .47	67 .01	65 .58	57 .82	45 .80	39 .36	35 .34
Clinton,	30 .13	30 .75	36 .36	44 .43	53 .18	62 .79	69 .68	68 .51	62 .54	52 .19	41 .27	33 .45
Cortland,	23 .87	22 .43	31 .17	43 .15	54 .03	62 .07	66 .18	64 .74	57 .28	46 .02	36 .16	26 .70
Delaware,	24 .43	30 .05	34 .80	39 .93	55 .74	70 .31	69 .77	65 .14	56 .02	44 .76	38 .19	30 .84
Dutchess,	26 .67	26 .40	36 .25	50 .12	59 .88	68 .19	73 .87	72 .10	63 .92	51 .97	41 .33	30 .00
Erasmus Hall,	31 .49	31 .37	40 .16	49 .14	50 .55	67 .36	72 .68	71 .40	64 .28	53 .47	44 .15	35 .16
Fairfield,	19 .86	20 .44	29 .58	41 .72	53 .53	62 .54	66 .07	65 .64	57 .82	45 .94	34 .19	23 .04
Farmers' Hall,	25 .65	26 .31	36 .54	47 .41	56 .22	64 .73	68 .69	67 .64	57 .76	48 .44	38 .78	28 .01
Franklin, M.,	18 .24	26 .14	31 .42	36 .54	47 .41	56 .22	64 .73	65 .44	55 .17	46 .91	32 .85	31 .22
Franklin, P.,	24 .47	24 .21	32 .99	46 .79	45 .07	53 .00	60 .22	65 .88	57 .54	45 .93	35 .21	28 .22
Fredonia,	28 .66	27 .41	35 .32	46 .45	56 .64	65 .36	70 .86	68 .81	61 .27	50 .55	41 .24	30 .82
Gaines,	25 .36	28 .38	34 .46	46 .54	54 .48	62 .99	71 .76	66 .38	59 .83	47 .69	35 .25	28 .45
Gouverneur,	19 .74	18 .64	30 .93	44 .53	54 .89	63 .59	68 .86	67 .23	58 .18	47 .02	33 .79	19 .97
Granville,	20 .67	20 .09	31 .29	43 .63	56 .15	66 .49	70 .82	68 .35	58 .72	47 .70	35 .81	24 .79
Greenville,	30 .27	27 .93	33 .77	40 .18	62 .51	66 .77	68 .87	68 .72	61 .23	51 .26	36 .96	33 .13
Hamilton,	22 .90	22 .95	31 .80	45 .43	54 .97	63 .08	67 .36	65 .86	58 .28	45 .88	35 .63	26 .35
Hartwick,	24 .23	25 .22	38 .89	44 .42	56 .47	65 .07	68 .25	66 .72	58 .75	48 .46	38 .61	26 .94
Hudson,	25 .02	25 .74	34 .89	47 .46	58 .87	67 .53	71 .45	71 .31	61 .56	49 .82	38 .67	27 .93
Ithaca,	28 .14	27 .04	34 .62	46 .98	57 .52	65 .13	70 .59	68 .64	60 .32	48 .69	39 .03	30 .69
Johnstown,	21 .28	22 .11	31 .50	43 .08	55 .66	65 .16	69 .00	67 .80	58 .24	46 .59	34 .39	23 .61
Kinderhook,	22 .89	23 .33	33 .74	46 .29	57 .26	65 .44	70 .15	68 .47	60 .30	47 .54	38 .38	25 .30

Kingston,	27 .34	26 .65	35 .09	49 .37	58 .52	58 .90	75 .21	70 .90	62 .01	50 .67	41 .09	30 .51
Lansingburgh,	22 .75	24 .56	34 .18	47 .60	59 .15	67 .84	71 .75	70 .20	61 .83	49 .65	38 .56	27 .12
Lewiston,	27 .23	26 .92	34 .80	46 .32	56 .73	64 .73	71 .25	69 .56	61 .79	49 .74	39 .11	29 .74
Lowville,	20 .11	28 .68	29 .67	44 .28	54 .15	62 .98	67 .41	65 .23	57 .17	45 .87	34 .09	23 .83
Mexico,	22 .68	22 .16	31 .12	42 .29	51 .91	62 .72	66 .48	65 .69	58 .47	44 .04	34 .61	25 .44
Middlebury,	26 .27	26 .29	33 .96	45 .58	56 .10	63 .89	68 .75	66 .91	59 .14	48 .00	37 .21	29 .17
Millville,	26 .00	26 .36	32 .28	45 .55	54 .68	63 .23	68 .24	67 .73	59 .50	46 .62	37 .75	28 .99
Monroe,	26 .85	22 .72	36 .98	48 .51	57 .17	64 .72	68 .21	63 .87	57 .91	49 .58	33 .40	26 .89
Montgomery,	25 .36	27 .02	36 .63	47 .63	58 .36	65 .99	72 .34	70 .31	62 .51	49 .23	39 .47	29 .03
Mount Pleasant,	27 .96	29 .38	38 .03	48 .34	57 .87	67 .68	71 .21	71 .12	62 .49	50 .63	40 .19	30 .25
Newburg,	27 .81	26 .88	35 .96	48 .19	59 .13	67 .76	72 .25	70 .95	63 .33	51 .83	40 .83	29 .84
New-York,	31 .76	29 .45	37 .28	97 .93	57 .68	68 .07	73 .10	71 .50	63 .94	52 .19	44 .31	34 .95
North Salem,	27 .13	25 .71	35 .81	46 .68	56 .96	66 .02	71 .25	69 .39	60 .71	49 .21	39 .45	28 .92
Ogdensburgh,	24 .75	12 .33	32 .94	39 .81	52 .54	66 .53	71 .66	68 .31	59 .22	44 .58	29 .74	19 .43
Oneida Conference,	21 .58	21 .16	30 .33	43 .33	53 .33	61 .68	66 .47	64 .88	57 .48	47 .63	35 .15	24 .19
Oneida Institute,	19 .68	20 .85	29 .08	43 .74	56 .48	64 .53	71 .41	65 .99	58 .50	47 .09	34 .57	23 .97
Onondaga,	25 .28	25 .66	33 .81	45 .96	58 .01	65 .49	68 .90	68 .05	59 .75	48 .26	36 .54	29 .12
Oxford,	22 .24	22 .24	31 .66	44 .79	55 .26	63 .44	68 .08	66 .02	57 .70	45 .73	34 .80	24 .88
Oyster Bay,	27 .48	35 .11	38 .94	49 .31	57 .58	67 .17	72 .57	70 .30	64 .02	54 .00	43 .26	33 .96
Palmyra,	25 .93	20 .37	30 .68	49 .84	56 .20	64 .46	67 .96	64 .00	54 .39	54 .39	51 .78	39 .82
Plattsburgh,	21 .67	19 .91	30 .66	40 .45	56 .13	65 .31	69 .43	68 .86	59 .55	46 .34	39 .51	26 .38
Pompey,	20 .94	20 .72	29 .78	41 .05	52 .50	61 .71	65 .97	64 .29	55 .19	44 .65	32 .47	23 .85
Redhook,	24 .66	26 .06	35 .83	49 .13	58 .00	67 .02	71 .88	68 .64	61 .61	50 .41	39 .58	27 .58
Rochester,	26 .25	25 .92	32 .90	45 .57	56 .05	64 .62	69 .76	67 .71	60 .11	47 .83	38 .39	28 .62
St. Lawrence,	18 .41	18 .78	29 .98	43 .75	55 .02	63 .97	68 .39	66 .74	57 .37	44 .99	33 .72	22 .11
Schenectady,	21 .74	19 .94	28 .88	44 .74	58 .15	66 .62	68 .77	66 .86	59 .82	46 .78	37 .45	29 .19
Springville,	24 .88	25 .95	30 .75	45 .45	53 .14	61 .62	67 .51	64 .18	57 .62	46 .23	37 .49	28 .13
Syracuse,	30 .90	20 .56	26 .14	45 .51	58 .30	66 .66	71 .24	71 .49	64 .28	47 .72	32 .80	32 .12
Union Hall,	29 .44	29 .34	37 .63	47 .24	56 .96	64 .91	71 .23	70 .58	61 .99	51 .85	41 .72	32 .51
Union, L. S,	23 .73	22 .91	32 .64	48 .18	56 .50	64 .68	69 .59	66 .13	60 .04	48 .98	37 .77	25 .93
Utica,	23 .27	23 .35	32 .28	44 .71	56 .45	64 .22	68 .55	66 .74	58 .43	47 .38	36 .23	26 .79
Washington,	22 .43	22 .75	32 .57	45 .65	57 .03	65 .94	69 .29	69 .55	60 .06	46 .63	38 .55	28 .31
Mean,	24°.68	24°.11	33°.44	45°.30	56°.21	65°.60	69°.67	68°.46	59°.87	48°.27	37°.67	27°.24

TABLE *showing the progress of the seasons, as indicated by the first frost in autumn, and the first fall of snow.*

STATIONS.	FIRST ANTUMNAL FROST.				FIRST FALL OF SNOW.			
	Years reporting	Earliest date.	Latest date.	Mean date.	Years reporting	Earliect date.	Latest date.	Mean date.
Albany,	19	Sept. 9,	Oct. 28,	Oct. 7,	22	Oct. 13,	Nov. 29,	Nov. 11.
Amenia,	1	Oct. 9,	Oct. 9,	Oct. 9,	1	Oct. 30,	Oct. 30,	Oct. 30.
Auburn,	20	Aug. 5,	Oct. 27,	Oct. 1,	10	Sept. 27,	Dec. 17,	Oct. 30.
Bridgewater,	4	Aug. 4,	Sept. 30,	Sept. 3,	4	Oct. 13,	Nov. 12,	Oct. 25.
Cambridge,	8	Aug. 24,	Oct. 25,	Sept. 24,	13	Oct. 12,	Nov. 23,	Nov. 7.
Canajoharie,	1	Sept. 18,	Sect. 18,	Sept. 18,	3	Oct. 20,	Nov. 30,	Nov. 11.
Canandaigua,	9	Sept. 6,	Oct. 14,	Sept. 23,	10	Sept. 25,	Nov. 29,	Nov. 5.
Cayuga,	11	Sept. 18,	Oct. 28,	Oct. 14,	11	Oct. 15,	Nov. 24,	Nov. 3.
Cherry Valley,	12	Aug. 21,	Oct. 7,	Sept. 19,	13	Sept. 20,	Nov. 14,	Oct. 25.
Clinton,	15	Sept. 28,	Nov. 27,	Oct. 23,	16	Nov. 7,	Dec. 29,	Dec. 3.
Cortland,	17	Aug. 4.	Oct. 16,	Sept. 14,	17	Sept. 23,	Nov. 11,	Oct. 19.
Dutchess,	14	Sept. 10,	Oct. 16,	Oct. 1,	16	Oct. 12,	Dec. 17,	Nov. 19.
Erasmus Hall,	24	Sept. 13,	Oct. 26,	Oct. 4,	23	Oct. 30,	Dec. 17,	Nov. 22.
Fairfield,	18	Aug. 29,	Oct. 12,	Sept. 13,	17	Sept. 28,	Nov. 15,	Oct. 18.
Farmers' Hall,	9	Sept. 2,	Oct. 12,	Sept. 28,	11	Nov. 16,	Dec. 17,	Nov. 30.
Franklin, (M.),	3	Aug. 29,	Sept. 12,	Sept. 7,	3	Sept. 22,	Oct. 25,	Oct. 5.
Franklin, (P.),	10	Sept. 9,	Oct. 16,	Sept. 26,	1	Sept. 29,	Nov. 30,	Nov. 7.
Fredonia,	16	Aug. 29,	Oct. 25,	Sept. 28,	17	Oct. 14,	Dec. 4,	Nov. 1.
Gaines,	4	Sept. 12,	Oct. 6,	Sept. 25,	4	Sept. 27,	Nov. 9,	Oct. 22.
Gouverneur,	12	Aug. 25,	Oct. 1,	Sept. 12,	12	Sept. 27,	Nov. 18,	Oct. 26.
Granville,	12	Sept 12,	Oct. 26,	Sept. 26,	14	Oct. 12,	Dec. 5,	Nov. 7.
Hamilton,	15	Aug. 3,	Oct. 13,	Sept. 11,	15	Sept. 22,	Nov. 12,	Oct. 15.
Hartwick,	13	Aug. 4,	Oct. 21,	Sept. 21,	13	Sept. 28,	Nov. 15,	Nov. 4.
Johnstown,	13	Sept. 2,	Oct. 12,	Sept. 19,	14	Oct. 12,	Nov. 16,	Nov. 10.
Kinderhook,	16	Sept. 1,	Oct. 9,	Sept. 22,	17	Oct. 18,	Nov. 28,	Nov. 6
Kingston,	15	Sept. 9,	Oct. 17,	Sept. 25,	18	Oct. 12,	Dec. 15,	Nov. 19
Lansingburgh,	17	Sept. 6,	Oct. 17,	Oct. 1,	16	Oct. 12,	Nov. 25,	Nov. 8

Lewiston,	17	Aug. 4,	Oct. 16,	Sept. 22,	18	Sept. 27,	Nov. 28,	Nov. 1.
Lowville,	17	Sept. 1,	Oct. 6,	Sept. 17,	19	Oct. 15,	Dec. 19,	Oct. 30.
Mexico,	11	Sept. 10,	Oct. 7,	Sept. 19,	11	Oct. 13,	Nov. 12,	Oct. 29.
Middlebury,	17	Aug. 28,	Oct. 15,	Sept. 22,	17	Sept. 30,	Nov. 29,	Nov. 6.
Millville,	8	Sept. 11,	Oct. 14,	Sept. 24,	8	Oct. 14,	Nov. 10,	Oct. 23.
Monroe,	1	Sept. 28,	Oct. 28,	Sept. 28,	3	Sept. 28,	Nov. 11,	Oct. 24.
Montgomery,	8	Aug. 30,	Nov. 3,	Sept. 22,	11	Oct. 12,	Dec. 3,	Nov. 15.
Mount Pleasant,	9	Aug. 4,	Nov. 3,	Sept. 28,	12	Oct. 23,	Dec. 18,	Nov. 18.
Newburgh,	15	Sept. 23,	Oct. 23,	Oct. 3,	18	Oct. 12,	Dec. 17,	Nov. 21.
New-York,	6	Oct. 9,	Oct. 31,	Oct. 18,	6	Nov. 17,	Dec. 2,	Nov. 23.
North Salem,	19	Aug. 4,	Oct. 11,	Sept. 18,	19	Oct. 4,	Dec. 11,	Nov. 16.
Ogdensburgh,	1	Sept. 2,	Sept. 2,	Sept. 2,	1	Oct. 13,	Oct. 13,	Oct. 13.
Oneida Conference,	19	Aug. 4,	Oct. 3,	Sept. 12,	19	Sept. 29,	Nov. 23,	Oct. 23.
Oneida Institute,	5	Aug. 4,	Oct. 4,	Sept. 9,	7	Oct. 13,	Nov. 24,	Nov. 5.
Onondaga,	15	Sept. 6,	Oct. 23,	Sept. 27,	15	Sept. 27,	Dec. 8,	Oct. 31.
Oxford,	16	Sept. 3,	Sept. 30,	Sept. 16,	16	Sept. 28,	Nov. 27,	Oct. 22.
Oyster Bay,	2	Sept. 30,	Oct. 5,	Oct. 3,	2	Nov. 14,	Nov. 16,	Nov. 15.
Plattsburgh,	5	Sept. 10,	Oct. 9,	Sept. 29,	5	Oct. 15,	Nov. 24,	Nov. 5.
Pompey,	15	Sept. 3,	Oct. 15,	Sept. 23,	16	Sept. 27,	Nov. 7,	Oct. 18.
Red Hook,	9	Sept. 13,	Oct. 29,	Oct. 5,	12	Oct. 12,	Dec. 15,	Nov 16.
Rochester,	18	Sept. 11,	Oct. 13,	Sept. 26,	18	Oct. 6,	Nov. 29,	Oct. 28.
St. Lawrence,	20	Aug. 5,	Oct. 4,	Sept. 7,	20	Sept. 27,	Nov. 26,	Nov. 2.
Schenectady,	2	Sept. 21,	Oct. 21,	Oct. 6,	3	Oct. 12,	Nov. 23,	Nov. 6.
Springville,	7	Aug. 4,	Sept. 29,	Sept. 9,	7	Sept. 27,	Nov. 11,	Oct. 22.
Union Hall,	25	Sept. 2,	Oct. 23,	Oct. 1,	24	Nov. 4,	Dec. 11,	Nov. 24.
Union, L. S.,	7	Sept. 2,	Oct. 12,	Sept. 20,	9	Oct. 5,	Nov. 27,	Nov. 4.
Utica,	21	Aug. 4,	Oct. 17,	Oct. 4,	21	Sept. 28,	Dec. 3,	Nov. 1.
Washington,	9	Sept. 8,	Oct. 1,	Sept. 18,	9	Sept. 29,	Nov. 26,	Oct. 27.
Earliest,		Aug. 4,				Sept. 27,		
Latest,			Nov. 27,				Dec. 27,	
Mean,				Sept. 24,				Nov. 4.

TABLE *exhibiting the average results of Temperature at all the stations, for each of the years embraced in the series, with the highest and lowest degrees, and the extreme and mean range.*

YEARS.	Stations reporting.	THERMOMETER. Mean.	Highest degree.		Lowest degree.		Extreme an. range.	Mean mo. ra'ge
1826,	21	48°.71	100,°	3 statione,	—26,	Hamilton,	126°	54°
1827,	30	46 .83	101,	Newburgh,	—32,	2 stations,	133	49
1828,	33	49 .70	100,	Montgomery,	—24,	Lowville,	124	46
1829,	16	46 .54	98,	2 stations,	—28,	2 stations,	126	49
1830,	40	48 .24	104,	Montgomery,	—33,	Lowville,	137	49
1831,	39	47 .18	98,	Montgomery,	—30,	Hartwick,	128	48
1832,	38	47 .12	99	Dutchess,	—30.	Gouverneur,	129	51
1833,	43	46 .88	99,	Montgomery,	—31,	Gouverneur,	130	50
1834,	42	47 .51	101,	2 stations,	—27,	Gouverneur,	128	51
1835,	46	45 .98	98,	3 stations,	—40,	2 stations,	138	53
1836,	33	43 .96	98,	Granville,	—36,	Oxford,	134	51
1837,	34	45 .64	98,	Montgomery,	—32,	Oneida Institute,	130	50
1838,	33	45 .54	101,	2 stations,	—30,	Gouverneur,	131	50
1839,	37	46 .47	98,	Farmers' Hall,	—35,	Lowville,	133	51
1840,	37	47 .23	102,	Washington,	—32,	St. Lawrence,	134	50
1841,	39	45 .69	102,	North Salem,	—30,	Oxford,	132	50
1842,	44	46 .71	100,	2 stations,	—24,	Gouverneur,	124	50
1843,	39	44 .62	99,	Lansingburgh,	—26,	2 stations,	135	48
1844,	37	46 .98	94,	2 stations,	—30,	Johnstown,	124	50
1845,	35	47 .25	104,	Lansingburgh,	—28,	Gouverneur,	132	52
1846,	29	48 .28	101,	Lansingburgh,	—25,	Granville,	126	49
1847,	25	47 .29	99,	2 stations,	—26,	Washington,	125	53
1848,	25	47 .60	101,	Newburgh;	—30,	Granville,	131	49
1849,	23	46 .95	105,	2 stations,	—24,	Granville,	129	46
1850,	9	48 .67	98,	Union Hall,	—22,	Lansingburgh,	120	47

TABLE *showing the mean Temperature of the several months, from 1826 to 1850, inclusive, derived from the combination of the observations of all the stations.*

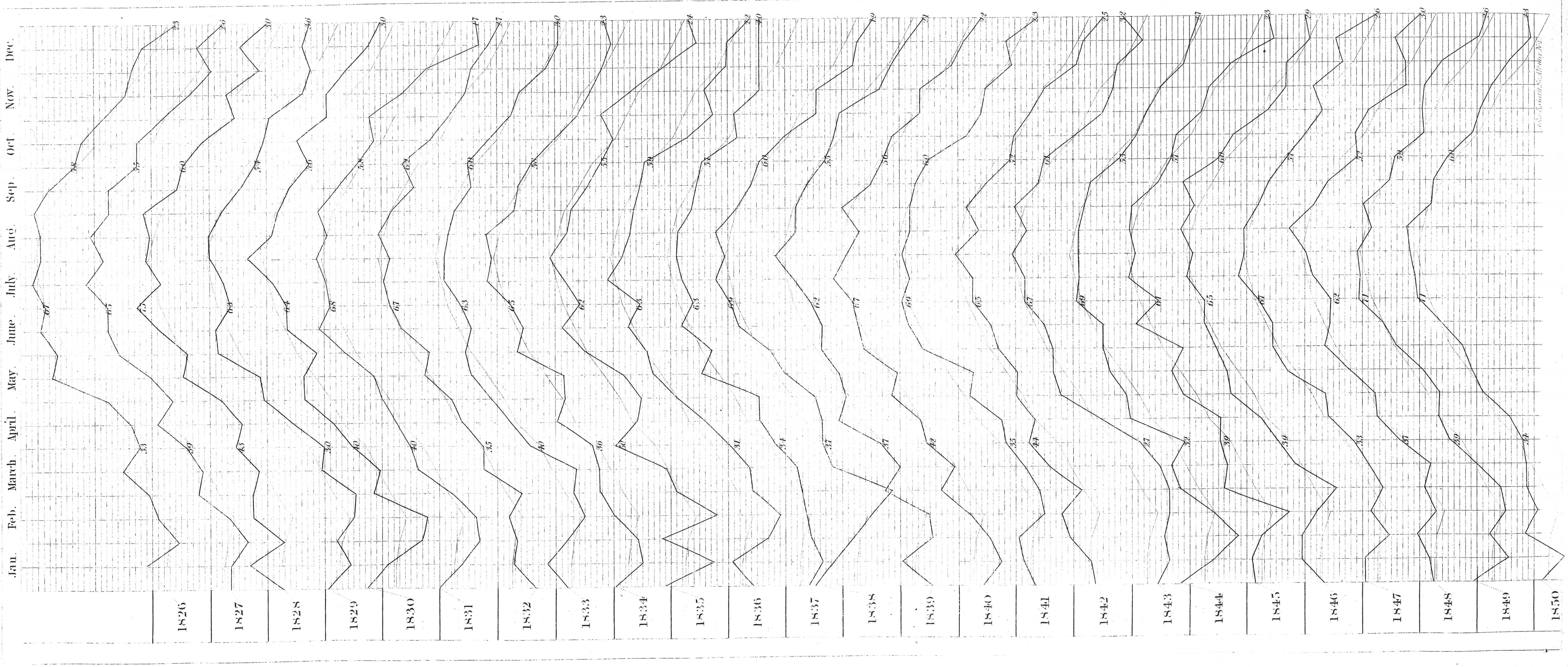
	January.	Febuary.	March.	Apri	May.	June.	July.	August.	September	October.	November.	December.
1826,	27°.20	29°.02	36°.31	51°.45	65°.03	67°.93	70°.09	69°.22	61°.56	50°.63	37°.47	26°.61
1827,	19 .78	28 .50	35 .32	45 .26	55 .70	65 .08	70 .02	69 .18	59 .90	50 .02	33 .31	29 .95
1828,	30 .15	34 .99	37 .92	42 .51	58 .22	70 .66	69 .35	71 .52	60 .85	56 .86	39 .13	34 .31
1829,	23 .47	19 .34	30 .72	45 .72	60 .09	65 .74	67 .28	67 .82	56 .16	49 .91	36 .09	36 .32
1830,	21 .75	23 .91	35 .86	51 .68	55 .32	63 .03	72 .18	67 .49	58 .92	51 .34	45 .18	32 .25
1831,	20 .30	21 .30	35 .07	47 .90	58 .42	69 .97	70 .72	70 .67	61 .37	52 .20	38 .08	16 .17
1832,	24 .56	24 .53	35 .00	43 .47	54 .88	64 .83	68 .81	68 .62	60 .30	50 .23	39 .55	30 .25
1833,	29 .07	22 .36	31 .72	49 .91	60 .34	61 .18	68 .48	65 .58	59 .54	47 .76	37 .30	29 .38
1834,	22 .43	32 .76	36 .01	48 .04	55 .16	62 .89	72 .86	72 .03	60 .63	46 .94	36 .90	26 .68
1835,	24 .20	20 .86	40 .58	42 .15	54 .14	65 .10	69 .69	65 .90	56 .93	52 .09	38 .17	22 .03
1836,	23 .59	17 .34	27 .05	42 .38	57 .99	64 .12	69 .48	63 .34	60 .18	39 .87	35 .52	26 .64
1837,	18 .93	23 .97	30 .41	39 .98	53 .67	64 .25	67 .15	62 .54	59 .07	46 .78	39 .37	38 .59
1838,	30 .39	15 .90	35 .59	38 .44	52 .41	68 .16	72 .69	70 .84	61 .06	45 .59	32 .99	22 .40
1839,	23 .87	27 .40	33 .30	49 .48	54 .95	59 .52	69 .91	65 .73	58 .52	52 .07	35 .56	27 .31
1840,	17 .52	31 .39	37 .96	48 .36	56 .85	65 .78	70 .95	67 .56	58 .17	48 .17	38 .63	25 .48
1841,	27 .53	20 .75	31 .24	41 .05	53 .49	68 .56	68 .87	66 .72	62 .23	43 .74	35 .69	28 .41
1842,	27 .75	31 .04	44 .39	47 .24	52 .39	61 .97	67 .85	67 .00	57 .61	48 .21	34 .10	26 .23
1843,	18 .00	17 .52	23 .86	46 .62	56 .52	62 .27	68 .67	68 .79	61 .81	45 .27	36 .62	29 .57
1844,	17 .17	28 .31	34 .35	52 .10	58 .68	64 .74	68 .42	67 .41	60 .54	46 .63	36 .67	28 .68
1845,	26 .70	26 .71	38 .04	45 .85	54 .08	64 .59	69 .92	70 .06	59 .14	50 .32	40 .01	21 .61
1846,	26 .28	22 .37	35 .82	49 .36	59 .44	65 .33	69 .93	70 .57	66 .16	48 .37	36 .89	28 .84
1847,	25 .19	25 .01	30 .33	42 .47	58 .22	63 .96	72 .20	68 .62	60 .15	46 .99	42 .95	32 .47
1848,	24 .08	26 .76	31 .19	45 .32	59 .77	61 .71	68 .91	71 .73	56 .80	50 .06	35 .54	34 .36
1849,	21 .63	20 .84	35 .44	43 .53	53 .30	66 .64	70 .96	68 .98	60 .31	48 .72	45 .65	27 .86
1850,	31 .22	30 .22	33 .54	42 .57	53 .42	68 .22	72 .24	70 .11	62 .38	50 .45	62 .26	27 .14

Diagrams have been constructed for representing to the eye the comparative vicissitudes of temperature, and their decadance upon the seasons at different places and for successive years, which will afford essential aid in understanding the numerical tables we have given containing these data. Assuming an arbitrary scale for representing changes of temperature in the vertical direction, and time horizontally, a line is drawn across the diagram, rising or falling with the temperature, and representing by its deflections the changes of heat and cold throughout the year.

The accompanying diagram entitled "Comparative range of temperature at different stations," is a delineation of the mean annual fluctuations of temperature through the several months, at each place where observations were reported ten years or more, and is constructed as follows: The sheet is first ruled with horizontal and vertical lines, the intervals between the former of which represent differences of temperature, and of the latter of time. Every fifth horizontal line is heavier than the others, and the spaces between each of these heavy lines represent ten degrees of temperature. In laying down the curve of each station, the first heavy line below the name of the station is assumed to represent 20°, and the curve is carried through such points on the lines for months, as represent the mean temperatures of each. The spaces between the vertical lines, represent half months, and at intervals figures are placed, to show the temperature at the points of intersection of the curve.

The mean range of temperature throughout the State in each year, as shown by a combination of all the observations, is given in the accompanying diagram, entitled "Comparative range of the thermometer in different years," which is constructed on a plan similar to the one already noticed, except that the intervals between the curves is greater, and a faint line is traced with each, which represents the annual curve for the whole State, and the entire period. The deviation from the mean in particular months and seasons thus becomes strikingly apparent, and a careful study of the facts here figured, will convey to most persons a better knowledge of the subject than could be derived from the tabular statement from which it was constructed.

Table showing the comparative range of the Thermometer in different Years.



Comparative range of Temperature at different Stations.

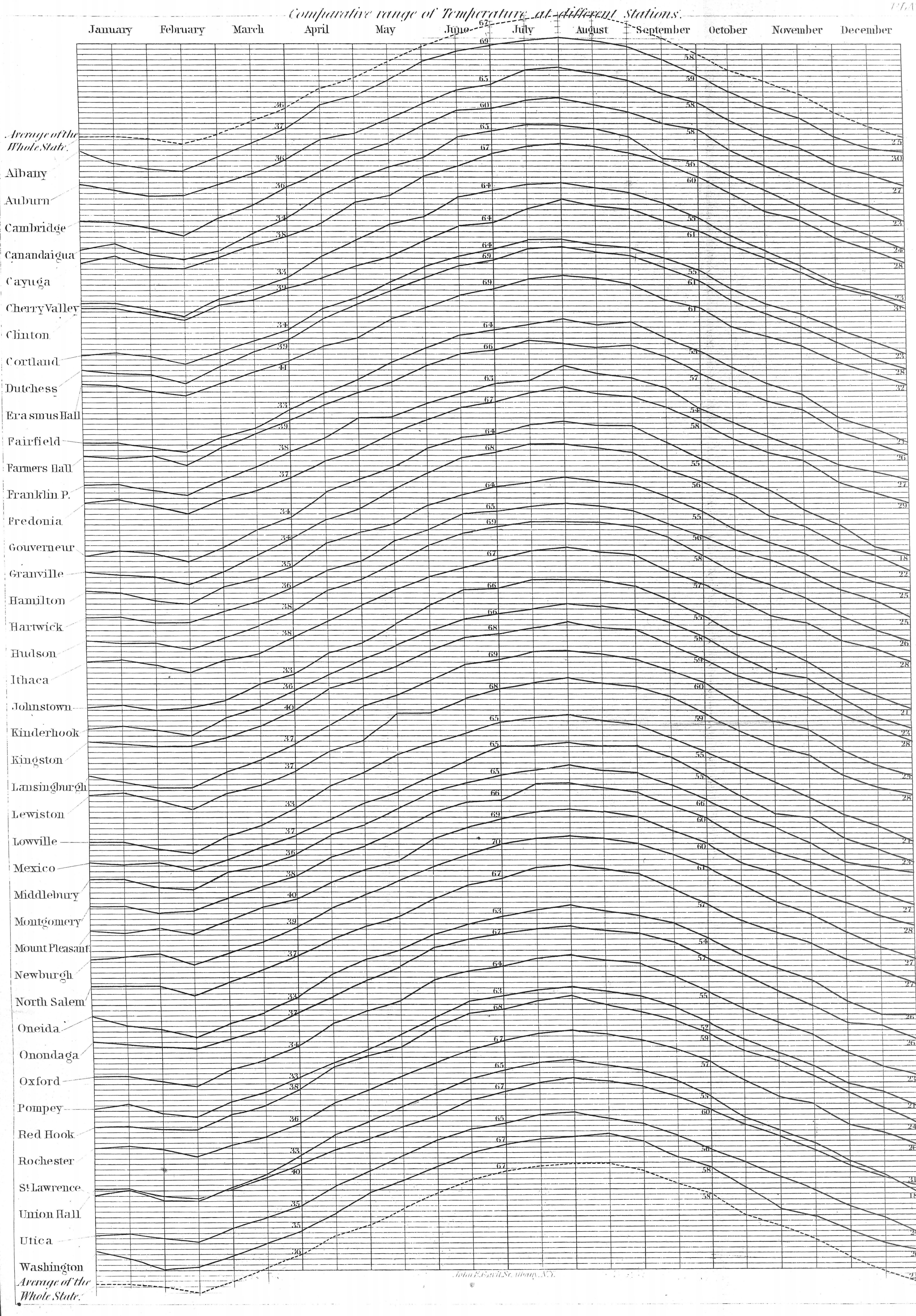


TABLE *showing the progress of the seasons, as indicated by the opening and closing of rivers, lakes and canals.*

YEAR.	NAVIGATION OF HUDSON RIVER.			NAVIGATION OF ERIE CANAL.			Lake Erie open at Buffalo.
	Began.	Ended.	Days open.	Began.	Ended.	Days open.	
1826,	Feb. 26,	Dec. 24,	301	April 20,	Dec. 18,	243	
1827,	Mar. 20,	25,	280	22,	18,	241	April 21.
1828,	Feb. 8,	23,	320	Mar. 27,	20,	269	1.
1829,	April 1,	Jan. 11, '30,	296	May 2,	17,	230	May 10.
1830,	Mar. 15,	Dec. 23,	283	April 20,	17,	242	5.
1831,	15,	5,	269	16,	1,	230	8.
1832,	25,	23,	273	25,	21,	241	April 27.
1833,	21,	13,	267	19,	12,	238	23.
1834,	Feb. 21,	15,	297	17,	12,	240	6.
1835,	Mar. 25,	Nov. 30,	250	15,	Nov. 30,	230	May 8.
1836,	April 4,	Dec. 7,	247	25,	26,	216	April 27.
1837,	Mar. 28,	13,	260	20,	Dec. 9,	234	May 16.
1838,	19,	Nov. 25,	251	12,	Nov. 25,	228	March 31.
1839,	21,	Dec. 18,	272	20,	Dec. 16,	241	April 11.
1840,	Feb. 21,	5,	297	20,	3,	228	27.
1841,	Mar. 24,	19,	270	24,	Nov. 30,	221	14.
1842,	Feb. 4,	Nov. 29,	298	20,	28,	222	March 7.
1843,	April 13,	Dec. 9,	240	May 1,	30,	214	May 6.
1844,	Mar. 14,	11,	272	April 15,	26,	222	March 14.
1845,	Feb. 24,	4,	282	15,	29,	228	April 3.
1846,	Mar. 22,	15,	268	16,	25,	224	11.
1847,	19,	24,	280	May 1,	30,	214	23.
1848,	9,	27,	293	1,	Dec. 9,	232	9.
1849,	Feb. 25,	25,	303	1,	5,	219	March 25.
1850,	Mar. 28,	17,	264	April 22,	11,	234	25.

The earliest date on which the Hudson has been open at Albany during forty-nine years, was February 4, in 1842, and the latest April 8, in 1807, the mean date being March 18. The earliest date of closing during sixty-six years, was November 13, in 1820, and the latest February 3, in 1790, the mean date being December 18. The shortest period during which it remained closed, was forty-two days in 1806, and the longest, one hundred and thirty six days, in 1842–3.

A comparison of the mean temperatures of different years, shows that in 1829, '35, '36, '37, '38, '39, '41, '42 and '43, it was below the general average, while in the other years in the series it was above. In 1830, a summer drouth was followed by copious autumnal rains, and an unusual mildness in November and December, which occasioned vegetation to start up with the vigor of spring growth. In many places buds put forth, and trees blossomed in November. At Flatbush, a second crop of pears attained half size, and peas and beans grew to their full size. At Potsdam, December 4th, marigolds were in full bloom, and thrifty mustard plants were seen six inches high.

In 1834, the spring opened unusually early, and frost and snows in May, destroyed many fruit trees in blossom. During the preceding winter, the snow had been deep, and the ground had not frozen in many sections.

Observations upon the *rain gage*, were directed to be made immediately after each rain, and stations were furnished with instruments of uniform construction for this purpose.

The result of these observations was as follows:

TABLE *showing the mean depth of rain in the several months at each station.*

STATIONS.	Years observations.	MEAN DEPTH OF RAIN AND MELTED SNOW.													
		January.	Febru'ry	March.	April.	May	June.	July.	August.	Septem'r	October.	Novem'r	Decem'r	Monthly mean.	Annual mean.
Albany,	24	2.91	2.62	3.02	2.88	4.04	4.50	4.09	3.44	3.47	3.76	2.30	2.95	3.42	40.93
Auburn,	22	2.50	2.04	2.13	2.22	3.45	3.57	3.13	3.23	3.20	3.39	2.85	2.72	2.88	34.52
Bridgewater,	4	4.26	2.84	3.01	4.26	3.47	5.36	4.82	2.74	2.55	4.37	4.12	4.35	3.67	44.02
Buffalo,	1	1.74	3.43	1.26	1.21	1.64	1.61	1.10	2.19	3.41	4.03	2.41	2.25	2.27	27.31
Cambridge,	13	3.36	2.61	2.12	3.36	3.65	4.66	3.91	3.98	3.27	3.60	2.29	2.29	3.35	40.14
Canandaigua,	10	2.94	3.13	2.31	2.68	4.53	3.89	3.22	3.12	2.81	3.26	2.77	2.36	3.10	37.15
Cayuga,	7	1.93	1.60	1.64	2.09	3.73	3.75	3.88	3.37	3.11	3.20	2.03	2.12	2.76	33.10
Cherry Valley,	14	3.13	2.62	2.99	3.09	3.67	4.56	4.41	3.19	3.92	3.64	2.17	2.73	3.43	41.14
Clinton,	16	2.22	2.50	2.68	3.58	4.13	2.99	2.93	3.06	3.26	3.63	3.63	3.07	3.22	38.60
Delaware,	2	2.32	2.65	3.02	1.45	5.87	7.18	4.79	3.41	1.96	4.18	1.39	1.65	3.49	41.87
Dutchess,	14	3.20	2.07	2.94	2.72	3.24	3.36	3.68	4.10	2.44	3.88	3.38	3.14	3.18	38.13
Erasmus Hall,	24	3.08	2.88	3.62	3.49	3.61	3.88	3.63	4.12	3.11	3.86	3.79	3.72	3.56	42.74
Fairfield,	18	2.69	1.79	2.36	2.53	3.09	4.29	4.21	3.65	3.08	3.56	2.46	2.74	3.05	36.64
Farmers' Hall,	8	2.59	2.55	2.61	2.05	3.44	3.27	2.95	2.66	2.79	3.13	3.34	3.44	2.83	33.94
Franklin, M.,	3	1.73	2.23	2.04	2.04	2.97	3.38	3.89	1.57	2.75	2.92	2.44	2.09	2.42	29.07
Franklin, P.,	9	1.96	1.83	2.41	2.64	3.15	4.04	3.32	2.51	3.25	2.86	2.41	2.60	2.75	32.98
Fredonia,	16	2.04	1.82	1.99	1.93	3.32	3.83	3.34	3.28	4.46	4.31	2.27	2.96	3.05	36.68
Gaines,	4	2.59	1.72	3.49	2.64	2.47	3.74	3.79	2.45	3.12	1.65	2.01	2.83	2.79	33.50
Gouverneur,	9	2.54	1.87	1.68	1.94	2.44	2.89	2.34	2.21	2.59	3.20	1.16	1.67	2.30	27.61
Granville,	14	2.08	1.42	1.74	2.13	3.47	3.21	3.62	2.97	2.67	2.90	2.88	2.59	2.64	31.69
Hamilton,	18	2.25	2.65	2.27	1.93	2.93	3.48	3.79	2.70	3.68	3.12	2.54	2.78	2.88	34.52
Hartwick,	14	2.66	2.15	2.59	3.10	3.35	4.05	4.24	2.91	3.09	3.54	2.20	2.54	3.11	37.38
Hudson,	17	2.68	2.33	2.77	2.54	3.13	3.68	3.66	2.98	2.73	3.98	2.59	2.89	2.99	35.96
Ithaca,	13	1.82	1.64	2.15	1.84	3.22	3.43	3.35	2.64	3.32	2.56	1.86	1.96	2.57	30.89
Johnstown,	14	3.30	2.77	3.62	2.99	3.45	4.26	4.01	3.14	2.87	3.28	2.33	2.87	3.32	39.82
Kinderhook,	17	2.21	1.53	2.48	2.97	3.41	4.55	4.35	3.35	3.94	3.25	2.69	2.75	2.99	35.81

TABLE.—(CONTINUED.)

STATIONS.	Years observations.	MEAN DEPTH OF RAIN AND MELTED SNOW.													
		January.	Febru'y	March.	April.	May.	June.	July.	August.	Septem'r	October.	Novem'r	Decem.	Monthly mean.	Annual mean.
Kingston,	19	3.26	2.21	2.97	2.53	3.70	3.84	4.09	2.68	2.24	3.11	3.46	3.34	1.13	37.53
Lansingburgh,	20	2.29	2.07	2.17	2.40	2.78	3.92	3.54	2.52	3.02	3.19	2.82	2.59	2.79	33.47
Lewiston,	13	1.40	1.11	1.39	1.51	1.98	2.46	2.34	1.96	2.59	2.67	1.68	1.11	1.85	22.23
Lowville,	18	2.34	2.38	1.78	1.90	2.79	3.42	3.67	2.84	2.82	3.28	2.94	2.22	2.72	32.69
Mexico,	11	2.27	2.06	2.26	1.40	2.77	2.38	2.75	2.12	2.79	3.94	3.07	3.08	2.56	30.78
Middlebury,	17	1.46	1.77	2.26	2.46	2.92	3.40	3.30	2.81	2.83	2.88	2.56	1.79	2.54	30.47
Millville,	6	2.46	1.88	1.68	2.11	2.13	2.65	2.34	2.09	3.75	3.14	2.75	1.95	2.41	28.94
Monroe,	2	1.66	1.81	1.06	3.21	1.84	3.47	1.53	3.01	3.42	3.98	1.38	.38	2.23	26.75
Montgomery,	13	2.72	2.23	2.25	2.94	2.78	4.07	3.92	2.86	2.38	3.55	2.87	2.36	2.91	34.93
Mount Pleasant,	12	2.15	1.50	2.55	3.57	3.63	3.14	4.46	4.12	3.10	3.22	2.28	2.44	3.02	36.19
Newburg,	17	2.73	2.09	2.26	1.99	4.09	3.52	3.17	3.00	3.19	3.61	3.11	2.25	2.96	35.58
New-York,	3	3.22	4.54	4.99	1.87	6.67	1.77	4.64	3.98	2.88	3.26	4.96	4.27	3.85	46.25
North Salem,	18	3.07	2.27	3.11	3.01	4.19	3.46	4.23	3.61	3.08	4.50	2.29	3.30	3.53	42.41
Ogdensburgh,	1	2.36	.97	1.18	.40	4.81	3.57	1.88	2.55	1.01	2.73	2.07	1.08	2.05	24.61
Oneida Conference,	18	2.46	2.12	2.60	2.78	3.76	4.50	4.10	3.58	3.55	3.58	4.00	2.77	3.19	38.30
Oneida Institute,	7	2.74	1.41	1.34	2.19	2.75	3.39	3.39	2.96	2.54	3.27	2.11	1.96	2.50	30.06
Onondaga,	16	2.54	1.48	1.79	2.02	2.77	3.69	3.41	3.19	2.67	3.26	2.48	1.95	2.62	31.39
Oxford,	17	2.64	1.98	2.25	2.66	3.41	4.08	4.03	2.63	3.25	3.44	2.45	2.25	3.00	36.05
Oyster Bay,	1	1.92	1.67	2.67	4.89	7.08	4.97	6.45	2.10	4.83	2.00	2.24	1.47	3.52	42.29
Palmyra,	1	1.22	.85	1.65	4.00	.98	5.61	4.19	4.08	3.27	5.06	1.96	.93	2.82	33.80
Plattsburgh,	3	3.05	3.28	4.63	2.81	2.35	3.74	2.53	2.81	3.31	4.53	2.43	2.63	3.17	38.09
Pompey,	15	1.87	1.30	1.19	1.56	2.76	4.38	4.11	3.37	3.09	2.90	1.65	1.24	2.45	29.46
Redhook,	10	2.72	1.54	2.43	3.16	3.09	4.15	4.26	2.96	2.61	2.89	2.53	2.48	2.89	34.73
Rochester,	18	1.91	1.37	1.83	2.01	3.08	3.31	2.98	2.66	3.15	3.46	2.90	2.06	2.56	30.77
St. Lawrence,	20	1.40	1.06	1.48	1.70	3.02	3.31	4.03	2.81	3.11	3.34	1.93	1.44	2.39	28.62
Schenectady,	2	7.16	4.52	2.14	4.62	3.07	3.85	3.11	1.92	2.59	2.76	2.77	2.28	3.34	40.79

Springville,	2	1.18	2.37	1.83	2.95	2.16	3.95	3.60	3.64	4.59	5.82	3.03	2.30	3.12	31.44
Syracuse,	1	2.46	1.83	3.63	1.63	1.10	3.00	2.19	2.15	4.68	5.41	2.83	2.12	2.75	33.03
Union Hall,	25	2.50	2.23	2.83	3.05	3.54	3.69	3.94	4.09	3.38	3.48	3.49	2.85	3.25	39.07
Union Literary Society,	9	1.98	1.83	1.48	1.86	2.45	2.48	2.96	2.60	2.91	4.00	2.86	2.12	2.46	29.55
Utica,	19	2.92	2.61	2.75	3.17	3.34	4.60	4.53	3.70	3.55	2.78	3.43	3.19	3.34	40.09
Washington,	7	1.89	1.36	2.88	1.75	2.33	3.52	4.39	3.09	3.31	3.28	2.46	2.54	2.73	32.80
Mean,	....	2.51	2.12	2.29	2.53	2.31	3.75	3.59	2.99	3.11	3.44	2.57	2.43	2.91	34.90

To show the relative quantity of rain in the several seasons, as influenced by the more characteristic topographical features of the State, the following summary is given, in which the monthly means of stations have been grouped into seven classes, based upon circumstances in some degree common to those included in each :

	Spring.	Summer.	Autumn.	Winter.
The Maritime Region, including Clinton, Erasmus Hall, New-York, Oyster Bay, and Union Hall; all except one being on Long Island,	4.07	3.75	3.45	2.93
The Eastern Region, mostly in the valleys of the Hudson and Lake Champlain, including Albany, Cambridge Dutchess, Farmers' Hall, Granville, Hudson, Kinderhook, Kingston, Lansingburgh, Montgomery, Mount Pleasant, Newburgh, North Salem, Plattsburgh, Red Hook, & Washington,	2.92	3.62	3.05	2.56
The Mohawk Valley, includ'g Fairfield, Johnstown, Oneida Inst., Schenectady and Utica,	3.25	3.67	2.96	2.86
The Susquehanna Valley, and its branches, including Bridgewater, Cherry Valley, Delaware, on a branch of Delaware, Franklin, Pa., Hamilton, Hartwick, and Oxford,	3.00	3.92	3.17	2.72
The Valley of the St. Lawrence, including Franklin, M., Gouverneur, Ogdensburgh, and St. Lawrence,	2.14	2.95	2.44	1.71
The Western Region, mostly in the vicinity of the smaller lakes, includ'g Auburn, Canandaigua, Cayuga, Ithaca, Middlebury, Oneida C., Onondaga, Pompey and Syracuse,	2.49	3.40	3.06	2.04

SUMMARY.—(CONTINUED.)

	Spring.	Summer.	Autumn.	Winter.
The Region of Lakes Erie and Ontario, including Buffalo, Fredonia, Gaines, Lewiston, Lowville, Mexico, Millville, Monroe-Palmyra, Rochester, Springville, and Union Lit. Soc., ...	2.19	2.95	3.30	1.94
Relative Quantity in the whole State, ...	2.38	3.44	3.04	2.35

TABLE *showing the mean results of all the observations in the several months and years embraced in the series.*

YEARS.	Greatest No. of stations.	MEAN DEPTH OF RAIN BY YEARS AND MONTHS.												Annual mean.
		January.	February.	March.	April,	May.	June.	July.	August.	September.	October.	November.	December.	
1826, ...	21	2.14	1.74	3.32	1.99	.81	7.02	3.12	2.21	2.88	3.28	2.03	2.06	2.72
1827, ...	30	3.77	3.17	1.95	3.72	2.81	3.48	3.70	4.08	1.00	5.02	2.82	3.32	3.49
1828, ...	33	2.08	2.34	1.90	2.41	3.28	3.74	5.69	3.20	5.29	2.11	4.37	.69	3.19
1829, ...	34	3.14	2.54	2.04	3.62	2.48	3.30	3.16	2.12	3.01	2.42	3.06	2.21	2.76
1830, ...	40	1.85	1.13	3.57	1.95	3.74	6.15	4.15	1.55	2.63	2.78	4.91	4.03	3.20
1831, ...	39	2.49	2.45	2.16	4.10	2.71	3.91	4.42	3.81	3.54	4.34	2.20	1.67	3.15
1832, ...	38	2.82	3.35	2.05	2.39	3.15	1.72	4.00	5.37	2.75	3.09	3.22	3.00	3.07
1833, ...	43	2.20	1.98	1.62	1.31	5.56	3.24	4.41	3.29	2.98	5.11	2.13	2.58	3.03
1834, ...	42	1.75	1.24	1.93	2.72	3.26	4.29	3.38	1.74	2.97	3.23	1.83	2.18	2.54
1835, ...	46	2.68	1.74	1.98	4.03	1.90	4.76	3.61	3.90	1.81	3.32	2.15	1.65	2.79
1836, ...	33	4.59	2.60	1.30	2.24	3.42	4.59	2.58	1.87	2.50	3.03	1.95	2.71	2.78
1837, ...	34	1.97	1.99	3.11	1.85	4.21	4.39	3.69	5.12	2.05	3.29	2.21	2.06	2.99
1838, ...	33	1.69	1.33	1.69	1.49	4.34	4.28	2.44	3.51	3.41	3.66	2.92	1.12	2.65
1839, ...	37	2.56	1.43	1.51	2.42	3.79	4.11	3.92	2.43	2.64	1.39	2.39	3.08	2.64
1840	37	2.02	2.14	2.46	3.40	3.15	3.20	3.13	3.49	3.12	4.43	2.47	2.56	2.96
1841, ...	39	3.37	.88	2.44	3.55	1.98	2.79	2.65	2.65	3.26	1.88	3.03	3.48	2.66
1842, ...	44	1.63	3.06	2.64	2.90	2.33	3.68	4.18	3.43	5.31	2.79	2.98	3.00	3.16
1843, ...	39	1.88	2.09	2.94	2.84	1.90	4.37	2.99	4.35	3.66	4.71	2.76	1.93	3.03
1844, ...	37	2.19	1.07	2.52	1.37	4.85	2.85	4.63	2.99	1.84	3.97	1.76	2.23	2.69
1845, ...	35	2.89	2.63	2.62	2.29	2.52	2.89	2.74	1.92	3.64	2.58	3.51	2.06	2.69
1846, ...	29	2.36	2.25	2.60	1.14	3.92	2.63	4.25	2.78	2.10	3.24	4.72	2.39	2.83
1847, ...	25	3.04	3.29	2.54	1.79	2.09	3.83	3.15	2.99	5.13	3.39	2.59	4.28	3.18
1848, ...	35	1.95	1.39	2.15	1.02	4.95	3.37	4.91	2.45	2.57	3.12	2.05	4.45	3.28
1849, ...	23	1.37	1.51	2.92	1.34	4.11	2.39	1.13	3.75	1.87	6.59	3.22	2.62	2.74
1850, ...	9	2.58	2.77	2.58	2.15	5.51	2.98	5.80	3.63	4.69	3.36	3.11	4.46	3.63

The above table, contains the results of parts of years reported by observers, while in the preceding one, only entire years are included, from which cause, the mean derived from the two methods will be found to differ in some cases, but the general result shows an excess of rain in the maritime region, and the vallies of the Hudson, Mohawk and Susquehanna, an amount below the average in the western part of the State, in the vicinity of the great lakes, and the least quantity in the valley of the St. Lawrence. The greatest annual mean depth was reported by New-York, and the least by Lewiston, the mean being less than twenty-eight inches at Lewiston, Buffalo, Gouverneur, Monroe, Ogdensburgh and Potsdam, while it was forty inches and upwards, at Albany, Bridgewater, Cambridge, Cherry Valley, Delaware, Jamaica, New-York, North Salem, Oyster Bay, Schenectady, and Utica.

From the last preceding table it appears, that the quantity of rain falling in different years has varied from a monthly mean of 2.64 in 1839, to 3.49; in 1827, the greatest amount in one month, being 7.02, June 1826; and the least, .69, December 1828. The quantity of rain falling is greatest in summer and autumn, and least in winter and spring. The quantity that falls in August, is near the annual mean, while it is most in June, and the least in February.

It has been observed in Europe,* and the observation is confirmed by experience in this country, that, other things being equal, the quantity of rain that falls is less as we recede from the sea coast, thus indicating that oceanic evaporation, is one of the principal sources of rain. The intimate relation between winds from the sea, and rain, will be subsequently noticed.

Difference of altitude, is found also to cause a notable difference in the quantity of rain that falls, and even in the same locality, an elevation of a few feet, is found to produce a remarkable contrast with the quantity at the earth's surface. At the New-York Institution for the Deaf and Dumb, in 1845–6, two similar instruments, five and eighty-five feet from the ground, gave in sixteen months, 60.2, and 44.7 inches respectively. Similar comparative observations at York, in England, at elevations of 0.43⅔, and 213 feet from the surface, gave in four years, an annual mean of 22.17, and 13 inches. It is noticed that the decrease upwards is less in warm than in cold weather,

* See Kaemitz's Meteorology, p. 139

from which it is inferred, that it would be less in low than in high latitudes. This fact seems to indicate, that rain drops continue to increase in size till they reach the ground, although in exceptional cases, by passing through strata of warm dry air, they may diminish from evaporation, or disappear altogether in mid air. Occasionally in fine weather in summer, descending streaks of falling rain, are observed below clouds, which thin out and vanish long before reaching the surface. In the protracted misty rains of autumn and winter, the difference at an elevated point, and at the surface, would be proportionally greater, than in summer showers.

It is a familiar fact, that the capacity of the atmosphere for moisture, is increased by heat and diminished by cold; that condensation of the air is accompanied by an evolution of heat, while its expansion produces cold, and that both the temperature and capacity for moisture diminish as we ascend from the earth's surface. The quantity of aqueous vapor in the atmosphere is constantly varying, and if a given mass of air is gradually cooled, it will descend to a degree of temperature at which it will be saturated by the quantity of vapor contained in it. This temperature is called the *dew-point*, because in summer nights, when by radiation the air at the earth's surface is cooled to this point, dew is formed, from the excess of moisture which it no longer is able to sustain at the reduced temperature. The dew-point varies with the quantity of aqueous vapor in the atmosphere, and its temperature. When this is ascertained it is easy to calculate by the aid of tables that have been constructed, the quantity of vapor corresponding to it.

The instrument now most used for ascertaining the moisture of the air is the psychrometer, which consists of two similar thermometers, the bulb of one of which is covered with thin muslin. When observed, this covered bulb is wet with pure water, the evaporation of which causes a rapid reduction of temperature until it reaches a stationary point. The difference then shown by the two thermometers, affords, by the aid of tables, the force of vapor and relative humidity of the air. Observations upon this instrument did not form a part of the series of records under consideration.

Notwithstanding the quantity of rain received by gages placed at different altitudes at a given place, indicate a much greater quantity at the surface, yet experience has shown that mountains and highlands may be frequently deluged with

rain, as they are often enveloped in clouds, while the weather of the plains and vallies below is serene. This is caused by the expansion and cooling of the warm and humid air, as it is brought by the winds from a lower level, and carried above the limit in which it is no longer able to support its vapor.

The remarkable dryness of our climate when compared with that of Europe, has often been remarked, and its cause must be ascribed to the prevalence of our westerly winds, which pass over the Rocky mountains, and a broad extent of continent instead of ocean. Hence our astronomical observatories are favored with more frequent and longer opportunities for observation, and manufactures depending upon evaporation or the drying process for their success, can be conducted with greater economy in this country. On the other hand, we cannot compete with Europe in some of the finer texile fabrics, which can be spun and woven best in a moist atmosphere.

That this dryness may have an influence upon the habits and customs of our people is highly probable, and a long series of observation may even show that intellectual activity, dependent upon bodily health, may be found to bear a certain relation to the difference of atmospheric conditions.

The excess of our summer and fall rains over those of winter and spring, is noticed to increase from south to north, thus in a measure reversing the order observed in tropical climates, in which the heaviest rains occur in their winter months.

The relative amount of cloudy sky does not bear so close a relation to the depth of rain at a given place as would be supposed, for the formation of clouds is influenced by circumstances of elevation, vicinity to mountains or lakes, &c. Summer showers sometimes fall miles to the leeward of the place where they originated, and local causes may produce a great difference between the relative amount of cloud and fall of rain in certain localities. The following table embraces the general results of observations upon the aspect of sky at the various stations embraced in the series, for the periods noted in each. Two entries of this class were made daily, one for the forenoon and the other for the afternoon, at no particular hour:

	Years.	Clear days per month.	Cloudy days per month.
Albany,	24	17.04	13.36
Amenia,	1	15.79	14.62
Auburn,	22	14.88	15.56
Bridgewater,	4	13.01	17.40
Buffalo,	2	14.98	15.48
Cambridge,	14	15.65	14.79
Canajoharie,	2	15.33	15.10
Canandaigua	10	13.68	16.67
Cayuga,	13	14.95	15.48
Cherry Valley,	15	14.94	15.49
Clinton,	17	20.41	9.93
Cortland,	18	14.20	16.24
Delaware,	2	19.21	11.25
Dutchess,	16	17.16	13.37
Erasmus Hall,	24	18.26	21.31
Fairfield,	19	11.13	18.31
Farmers' Hall,	11	19.16	11.28
Franklin, M.,	3	12.28	18.16
Franklin, P.,	10	16.62	13.82
Fredonia,	18	13.03	17.31
Gaines,	4	13.77	16.67
Gouverneur,	12	15.13	15.31
Granville,	14	17.64	12.80
Greenville,	1	15.95	19.45
Hamilton,	17	14.14	16.30
Hartwick,	16	14.07	16.37
Hudson,	17	15.95	14.49
Ithaca,	16	15.56	14.88
Johnstown,	16	17.53	12.91
Kinderhook,	17	15.06	15.38
Kingston,	20	18.18	12.19
Lansingburgh,	20	16.28	13.16
Lewiston,	18	16.41	14.03
Lowville,	19	13.32	17.11
Mexico,	11	15.76	14.68
Middleburg,	18	15.35	14.69
Millville,	8	14.79	15.64
Monroe,	3	16.91	13.53
Montgomery,	13	16.19	13.75
Mount Pleasant,	12	17.17	13.27
Newburgh,	18	16.96	13.48

	Years.	Clear days per month.	Cloudy days per month.
New-York,	5	12.50	17.90
North Salem,	19	18.37	12.06
Ogdensburgh	1	15.00	15.41
Oneida Conf.,	18	13.19	17.25
Oneida Inst.,	7	16.37	14.01
Onondaga,	16	14.86	15.58
Oxford,	17	13.50	16.89
Oyster Bay,	2	17.81	12.60
Palmyra,	1	15.46	19.95
Plattsburgh	5	15.70	15.70
Pompey,	17	13.61	16.83
Redhook,	12	18.35	12.09
Rochester,	19	13.90	16.54
St. Lawrence,	21	14.18	15.26
Schenectady,	3	16.20	14.14
Springville,	8	11.43	18.57
Syracuse,	1	13.16	17.25
Union Hall,	25	18.59	11.93
Union Literary Society,	9	15.21	15.14
Utica,	22	16.75	12.73
Washington,	11	16.12	14.32
Mean,		15.56	14.76

The relative amount of clear and cloudy sky in the several months, is shown in the following table, which indicates a progressive increase of serene sky from December to July, from which it declines to the following December:

Months.	Clear.	Cloudy.
January,	12.34	18.35
February,	12.72	15.57
March,	15.45	15.55
April,	16.36	16.56
May,	17.41	13.56
June,	17.47	12.56
July,	20.13	10.84
August,	19.56	11.10
September,	18.87	11.15
October,	15.81	15.19
November,	11.56	18.56
December,	10.56	20.09

The number of cloudy days, exceeds those that are clear, at twenty-seven of the sixty-two stations. At Clinton Academy, near the east end of Long Island, the amount of clear sky is greatest, and at Springville, near Lake Erie, the least—the extremes differing twenty-eight per cent of the whole time. So far as generalization can be applied, those stations adjacent to lakes, and those exceeding 800 feet in altitude, have an excess of cloudy days. The months of March and October, have a mean approaching that of the whole year.

No scale of cloudiness was adopted, and these observations do not tend to show how far the formation of cloud is influenced by the direction of the wind, by temperature, barometric pressure, or hydrometric conditions. It is commonly noticed in this State that continued north or north-west winds bring a clear sky and low temperature, while southerly and easterly winds bring clouds and rain, especially if they continue with violence during a few hours.

The presence of solar and lunar haloes, indicating the existence of minute spiculæ of ice in the upper region of clouds, has been popularly considered a precursor of rain, and observation has shown that this belief has some foundation in fact. Haloes are always seen in cirrus clouds, and are observed most frequently when the barometer is falling, especially in summer. Solar haloes occur most frequently in the spring months, while lunar haloes are seen most frequently in winter, the longer time during which the moon is above the horizon in that season, being favorable for their observation, and the conditions necessary for their formation being then most prevalent.

TABLE *showing the total number of days on which the Solar and Lunar haloes were observed during the several months and years embraced in the series.*

YEARS.	January.		February		March.		April.		May.		June.		July.		August.		Septem'r		October.		Novem'r.		Decem'r.	
	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.
1826,	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	....	....	....
1827,	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
1828,	1	3	....	1	....	....	2	3	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....
1829,	....	....	....	....	1	....	....	1	....	1	....	1	....	....	....	....	....	2	....	....	....	1	....	2
1830,	....	....	....	2	....	3	....	2	2	3	....	....	1	1	1	....	....	1	....	....	....	1	....	1
1831,	3	....	1	2	2	4	1	....	1	2	....	1	....	1	....	1	....	....	....	....	....	....	....	....
1832,	....	1	....	....	....	1	....	1	....	....	....	....	....	1	....	....	1	1	....	....	....	....	....	....
1833,	1	2	2	1	1	2	1	....	....	1	....	....	....	....	1	....	1	1	....	1	....	....	2	1
1834,	1	1	....	4	1	1	2	1	....	....	....	....	1	....	2	....	....	1	....	....	1	2	....	3
1835,	2	3	1	4	4	1	1	....	....	1	1	1	....	....	....	....	2	....	1	1	....	....	....	1
1836,	....	....	....	1	....	2	1	2	....	1	....	....	....	....	....	....	....	1	1	2	....	2	....	3
1837,	....	1	....	....	....	1	4	4	4	1	....	1	....	....	....	....	....	1	3	2	....	2	....	2
1838,	....	3	1	....	2	1	2	2	3	2	1	....	1	....	1	....	....	....	....	2	....	2	....	2
1839,	....	3	1	1	1	5	....	2	1	1	1	....	1	....	....	....	....	....	....	2	....	1	....	2
1840,	4	2	2	4	1	3	4	4	1	2	1	4	2	1	2	2	1	2	2	3	1	3	2	4
1841,	2	....	4	2	6	4	2	1	10	....	4	....	3	....	3	....	1	....	1	....	....	2	....	3
1842,	7	8	6	5	9	2	9	3	5	2	2	4	4	....	3	1	1	2	1	1	3	1	2	4
1843,	2	7	4	4	9	2	4	3	13	3	6	1	1	4	....	3	5	3	1	4	....	3	3	1
1844,	4	6	4	5	4	5	8	....	4	....	....	....	....	1	2	....	2	....	1	....	1	7	....	3
1845,	....	3	7	7	5	1	4	2	7	2	2	1	1	1	4	....	1	....	4	....	2	2	....	2
1846,	5	2	5	9	6	2	3	5	5	1	....	2	2	1	3	....	1	2	2	1	3	6	2	7

1847,	2	4	3	3	5	4	8	4	6	3	1	2	4	1	1	3	3	2	1	3	3	9	2	5
1848,	2	3	6	4	4	2	3	3	6	5	1	2	2	2	2	1	3	1	....	1	3	2	....	3
1849,	5	3	9	3	2	3	4	2	2	2	4	1	5	1	....	1	1	1	2	1	1	3	....	4
Total,	41	56	56	58	63	49	63	45	70	34	34	23	28	15	25	13	23	24	21	24	18	45	13	53

Total number of days on which solar haloes were seen,..						455
do	do	lunar		do	..	439
Seen in winter months,	solar, 110;	lunar, 167.			Total,..	277
do spring	do	196;	do	128.	Total,..	424
do summer,	do	87;	do	51.	Total,..	138
do autumnal,	do	62;	do	93.	Total,..	155

On several occasions remarkable combinations of arcs and circles were noticed in solar and lunar haloes.

Coronæ, or small colored circles around the sun or moon, when veiled with thin fleecy clouds, are of frequent occurrence, and were seldom recorded. They are formed by the diffraction of light passing through vesicular vapor, as in fogs, and are commonly noticed in thin dissolving cumulus clouds.

The *direction and force of the winds*, are found to have an important relation to temperature and rain, and in the observations of the New-York academies, the prevailing direction of the wind in the forenoon and afternoon of each day was required to be noted, but not at any fixed hour. It is an unfortunate fact, that the true course of the atmospheric currents at a given place can not always be satisfactorily determined, because the surface wind often differs considerably from that in the region of the clouds, and in a clear sky or in the night time, there is no method of ascertaining the direction of the upper currents. There was no notation adopted to indicate the relative force or velocity of the wind in these obsertions. The following table gives the results at the several stations. The surface current, and not that shown by the clouds, was noted.

TABLE *showing the mean direction and resultant of winds at the several stations.*

STATIONS.	Years observations	MEAN DIRECTION OF WINDS. North.	N. East.	East.	S. East.	South.	S. West.	West.	N. West.	RESULTANTS OF WINDS. Mean direction.	Pr. ct.	Days.
Albany,	24	4.11	1.98	.60	1.63	9.64	2.13	3.02	7.34	S. 76 19′ W.,	22	6.76
Amenia,	1	5.71	3.04	.46	2.54	6.46	4.50	1.25	6.46	N. 67 58 W.,	16	4.71
Auburn.	22	3.19	1.10	.38	2.26	6.98	5.91	2.32	8.33	S. 73 14 W.,	33	16.05
Bridgewater.	4	1.38	.38	1.20	1.19	8.07	4.56	9.70	4.36	S. 61 35 W.,	52	15.58
Buffalo,	2	6.69	4.02	2.58	2.85	2.75	10.69	3.42	3.71	S. 45 00 W.,	29	8.71
Cambridge,	14	.83	1.60	.17	.61	7.08	5.94	4.03	4.79	S. 87 55 W.,	33	9.91
Canajoharie,	2	.13	.02	3.79	6.08	.85	1.67	7.94	9.66	N. 85 20 W.,	26	7.86
Canandaigua,	10	1.12	.50	.59	1.24	7.91	4.22	10.89	4.09	S. 63 37 W.,	55	16.67
Cayuga,	13	5.85	.67	.52	1.58	9.49	2.89	3.87	5.59	S. 73 01 W.,	8.11	8.11
Cherry Valley,	15	1.46	1.96	1.71	.89	3.96	6.10	10.17	4.25	S. 77 27 W.,	47	14.08
Clinton,	17	2.17	3.51	3.67	3.08	3.77	4.70	3.55	3.88	S. 34 35 W.,	7	2.27
Cortland,	18	.07	.10	.12	2.30	4.93	8.89	1.56	12.46	S. 75 17 W.,	51	15.35
Delaware,	2	1.95	1.27	1.00	.95	5.60	8.47	6.54	4.72	S. 64 68 W.,	49	14.72
Dutchess,	16	5.81	3.38	.62	4.85	4.85	5.01	2.19	3.72	N. 80 21 W.,	12	3.57
Erasmus Hall,	24	2.15	4.82	.61	2.88	2.51	6.67	3.02	7.77	N. 76 00 W.,	24	7.39
Fairfield,	19	.27	.33	5.03	4.84	.65	1.39	8.27	9.96	N. 71 53 W.,	27	8.01
Farmers' Hall,	11	1.07	5.85	1.14	1.12	2.75	8.89	6.22	3.48	S. 76 20 W.,	30	9.14
Franklin, M.,	3	1.19	2.94	.63	1.44	3.85	6.71	9.73	4.01	S. 79 35 W.,	46	13.77
Franklin, P.,	10	1.96	.80	.52	.94	6.33	3.77	5.41	11.08	N. 87 34 W.,	48	14.23
Fredonia,	18	2.49	1.88	1.19	1.75	4.66	5.36	1.64	2.41	S. 71 26 W.,	43	13.07
Gaines,	4	1.41	3.27	1.78	2.73	1.24	6.29	3.64	9.99	N. 71 01 W.,	32	9.55
Gouverneur,	12	3.50	3.18	.64	1.34	3.85	8.50	4.62	4.76	S. 80 30 W.,	34	10.30
Granville,	14	10.24	.91	.23	1.08	7.50	7.77	1.26	1.43	S. 73 07 W.,	21	6.40
Greenville,	1	.71	2.95	1.08	9.46	.95	1.62	1.95	11.67	N. 34 49 W.,	9	2.68
Hamilton,	17	1.73	.90	.29	1 21	5.45	6.69	3.02	11.07	S. 86 28 W.,	46	13.80
Hartwick,	16	1.32	.87	.49	1.15	11.16	2.76	4.23	8.50	S. 60 11 W.,	40	11.95

TABLE.—(Continued.)

STATIONS.	Years' observations	Mean direction of winds. North.	N. East.	East.	S. East.	South.	S. West.	West.	N. West.	Resultants of winds. Mean direction.	Pr. ct.	Days.
Hudson,	17	6.95	1.66	.73	4.68	7.75	1.09	1.04	5.99	N. 70° 37′ W.,	5	1.47
Ithaca,	16	2.98	.95	.59	2.58	5.85	3.95	1.59	10.88	N. 85 38 W.,	37	11.03
Johnstown,	14	.19	2.39	4.99	1.58	.37	2.55	16.12	2.25	N. 89 07 W.,	39	11.72
Kinderhook,	17	1.20	.45	.36	.92	11.23	.95	.61	3.71	N. 45 13 W.,	12	3.64
Kingston,	20	1.70	7.09	.88	2.77	2.89	6.60	2.28	6.51	N. 63 00 W.,	14	4.10
Lansingburgh,	20	3.98	.94	.22	2.07	7.83	3.21	6.61	5.46	S. 78 50 W.,	35	16.59
Lewiston,	18	2.37	2.58	1.59	1.60	4.57	10.75	4.07	2.89	S. 52 57 W.,	38	11.58
Lowville,	19	5.31	.64	.46	3.73	6.83	2.45	3.87	7.00	S. 86 24 W.,	26	7.17
Mexico,	11	2.07	.89	1.52	4.88	3.75	2.86	9.69	4.87	S. 72 08 W.,	33	10.07
Middlebury,	18	2.31	1.68	.36	.54	1.49	14.90	5.41	3.74	S. 69 23 W.,	59	17.80
Millville,	8	1.65	3.71	1.63	2.90	2.32	8.92	3.25	6.05	S. 74 18 W.,	26	7.85
Monroe,	3	3.29	1.47	1.78	1.40	6.82	7.07	5.06	3.39	S. 53 48 W.,	42	12.66
Montgomery,	13	3.25	3.23	.91	1.45	4.66	4.48	7.02	5.44	N. 86 59 W.,	33	9.88
Mount Pleasant,	12	4.28	2.72	.67	2.79	6.21	4.02	1.49	8.23	N. 80 52 W.,	19	5.67
Newburgh,	18	2.85	5.72	.64	1.88	4.18	6.93	3.85	4.36	S. 85 40 W.,	19	5.84
New-York,	5	1.18	5.90	.53	4.03	.90	4.59	5.63	7.39	N. 78 45 W.,	28	8.56
North Salem,	19	1.65	3.29	1.42	3.72	2.78	6.44	3.52	7.59	S. 84 59 W.,	23	7.09
Ogdensburgh,	1	1.71	5.88	.62	.67	3.41	10.58	4.50	3.04	S. 69 18 W.,	31	9.47
Oneida Conference,	18	.88	.51	.56	1.82	5.27	5.83	5.64	9.92	S. 80 34 W.,	48	14.93
Oneida Institute,	7	1.39	.63	6.55	1.76	2.73	2.76	11.53	8.08	S. 77 18 W.,	25	7.48
Onondaga,	16	1.56	.76	1.17	2.15	7.91	2.23	8.19	6.38	S. 58 17 W.,	39	11.90
Oxford,	17	5.39	2.34	3.34	.49	3.99	6.74	7.10	6.04	N. 89 03 W.,	44	14.30
Oyster Bay,	2	.89	6.58	.73	3.27	2.23	7.88	1.62	7.23	N. 83 34 W.,	15	4.64
Palmyra,	1	1.88	2.25	.79	6.04	1.58	6.79	4.92	6.21	S. 69 10 W.,	26	7.98
Plattsburgh,	5	6.62	1.39	.45	2.49	9.45	1.09	3.12	5.82	N. 79 32 W.,	16	6.33
Pompey,	17	.37	.88	.19	3.11	4.75	7.69	6.50	7.42	S. 66 34 W.,	51	15.44

Redhook,	12	8.97	2.42	1.39	2.12	9.78	1.17	1.32	1.84	S. 84 06 E.,	3	1.18
Rochester,	19	2.16	2.75	1.12	2.09	2.12	5.80	6.79	7.51	N. 81 58 W.,	39	11.74
St. Lawrence,	21	1.83	4.75	.25	.99	4.26	11.04	2.49	4.85	S. 55 15 W.,	34	10.29
Schenectady,	3	1.39	1.62	1.18	4.76	3.90	1.33	7.73	8.51	N. 87 33 W.,	31	9.35
Springville,	7	1.81	2.33	1.29	1.70	1.87	6.48	8.91	4.96	S. 86 59 W.,	42	12.72
Syracuse,	1	.33	.75	2.29	4.33	3.00	3.25	10.37	6.08	S. 73 54 W.,	38	11.56
Union Hall,	25	2.20	3.89	1.34	2.55	2.93	5.92	2.81	8.19	N. 75 07 W.,	24	11.93
Union Lit. S.,	9	2.54	3.27	1.18	2.61	5.92	4.95	6.31	3.32	S. 59 12 W.,	26	8.13
Utica,	22	.14	.15	6.30	2.39	1.90	2.35	15.12	1.25	S. 66 39 W.,	39	12.73
Washington,	10	5.36	3.61	.23	.80	4.92	10.31	2.20	2.99	S. 71 35 W.,	29	8.70
Mean,	......	2.81	2.81	1.26	2.44	4.76	5.42	5.54	6.04	S. 80° 00′ W.,	30	9.16

TABLE *showing the general average direction of the winds derived from a combination of all the stations reporting, including parts of years.*

	Greatest No. of stations reporti'g	RESULTS OF WINDS BY YEARS AND MONTHS.							
		North.	N. East.	East.	S. East.	South.	S. West.	West.	N. West.
1826,	21	2.74	1.57	1.17	2.79	5.59	4.52	5.15	6.51
1827,	30	3.04	1.65	1.39	2.06	4.73	4.52	5.81	6.94
1828,	33	2.23	1.47	1.64	2.15	5.70	6.17	5.37	5.77
1829,	35	2.31	1.86	1.32	2.03	4.88	6.20	6.14	5.95
1830,	40	3.22	2.49	1.52	1.90	5.34	5.15	5.22	5.57
1831,	39	2.94	1.82	1.06	1.84	5.28	5.56	6.18	5.71
1832,	38	3.41	2.01	1.17	2.13	6.17	5.46	4.72	5.42
1833,	43	3.04	2.19	1.07	2.49	5.41	5.36	5.02	5.81
1834,	42	3.12	2.39	1.15	2.27	4.82	5.74	4.92	6.04
1835,	46	2.67	2.09	1.22	2.15	4.92	6.32	5.69	5.35
1836,	33	2.90	2.58	1.83	2.92	4.89	4.49	5.49	5.48
1837,	34	3.11	1.87	1.39	1.23	5.21	4.45	5.58	6.59
1838,	33	2.64	2.29	.99	1.93	4.36	5.83	5.50	7.00
1839,	37	3.35	2.52	1.16	1.99	4.88	5.64	4.72	6.18
1840,	37	2.68	2.25	.98	2.22	5.02	5.69	5.16	6.54
1841,	39	3.71	2.56	1.11	2.01	5.34	4.73	4.93	5.95
1842,	44	2.80	2.30	1.19	2.23	5.39	5.14	5.39	6.02
1843,	39	2.87	2.12	1.21	2.08	4.41	5.41	6.09	6.19
1844,	37	3.17	2.54	1.22	2.10	4.96	5.28	5.40	5.81
1845,	39	2.90	1.69	1.08	1.99	4.92	6.09	5.37	6.37
1846,	29	3.44	2.69	.83	2.62	4.87	5.53	4.19	6.31
1847,	25	3.05	2.66	1.00	2.28	5.17	6.23	3.81	6.22
1848,	25	2.53	2.04	1.16	2.44	5.26	5.19	4.65	7.21
1849,	23	3.39	2.77	.98	3.60	4.59	4.52	3.68	6.88
1850,	9	2.88	2.02	1.57	1.95	3.91	5.93	3.05	7.06

One of the most striking results of the observations upon the winds, is the correspondence between their direction and that of the vallies in which the stations are located. At most of those on the Hudson, northerly and southerly winds were recorded in the greatest number; in the Mohawk valley, easterly and westerly or north-westerly winds; and at nearly every other place, the prevailing direction of the neighboring hills and valleys was found to influence that of the surface current. A close observation of the direction of the clouds would give a much more correct knowledge of the true motion of the winds at a given place.

The hills and valleys of New-York are for the most part northerly and southerly in direction, the principal exception being the narrow and deep valley of the Mohawk. Lake Champlain may be said to lie in a continuation of the Hudson river valley, and the ridges and mountains that border both the lake and the river, have the same general direction. The mountain ranges between the Mohawk and the St. Lawrence, and the highlands of Orange county, have a north-easterly and south-westerly trend. The Catskill mountains have a north-westerly and south-easterly course, while the prevailing direction of the hills, valleys, rivers, and lakes of the central and western portions of the State is north and south. The counties bordering upon Pennsylvania are wholly or in part drained by the head waters of the Allegany, Susquehanna, and Delaware rivers, between which occur ranges of hills, constituting prolongations of the Allegany mountains, and having the same prevailing course.

With a knowledge of these influences, and the almost daily experience of their effects, it would naturally be inferred that the ultimate direction of the atmospheric currents across this State corresponded with the course most generally observed, and that the final result would show a northerly or southerly wind; but the combination of a series of records at a given place, almost uniformly shows, that the *resultant** or mean

* The resultant, or mean direction of the wind, is that course which it would take if simultaneously acted upon by forces proportioned in direction and amount to the combined observation of these elements in a given period; as for example, if the wind were to blow with uniform velocity six days from the north, and seven from the south, its progress would be one day from the south towards the north. As the wind blows longer in some directions than others, it is evident, that after deducting opposite quantities, and reducing the oblique directions to a single one, the result would show a final progress in the line of the largest force or longest time. The problem is like that for finding the direction and distance of a ship at sea

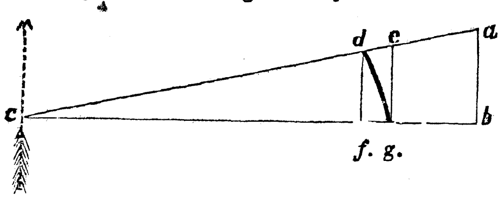
direction of the winds of our State is nearly at right angles with the prevailing course of our hills and vallies, thus agreeing with observations made elsewhere in the United States and Europe, and proving the influence and operation of great general laws, whose action encircles the globe itself.

The comparison of an extensive series of records made at 579 stations during an aggregate period of 2,829 years, in various parts of the northern hemisphere, has been made by Professor J. H. Coffin,* who derives from these data the general fact, that a zone or belt of westerly winds, about twenty-three and a half degrees wide, and embracing the southern portion of British America, all of the United States except its southern part, and nearly the whole of Europe, extends around the globe, having the pole of its southern as well as its northern limit, near a point in latitude north eighty-four degrees, and longitude west 105 degrees. Of 251 stations within the United States, all but six, had the mean direction of the wind westerly, the rate of progress being commonly greater as the direction approached a west point. The average rate at all of the stations was thirty per cent, while at the exceptional ones it was but eighteen.

Of the sixty-two stations embraced in the series under consideration, thirty-four have the mean direction south, and

from its starting point, after sailing in different directions a given time. In the absence of records of the velocity of the wind, it has been assumed to be uniform.

We will take the following example, and suppose that during a month the wind has blown from the N., 4.07; N. E., 1.50; E., .05; S. E., 1.85; S., 5.85; S. W., 3.88; W., 6.32; and N. W., 7.48 days. By subtracting opposite points we have S., 1.78; S. W., 2.38; W., 6.27; N. W., 5.63. By analyzing the S. W. into S. and W., by the aid of a traverse table, we find that 2.38 S. W. = 1.68 S., and 1.68 W., and that the 5.63 N. W. = 5.67 N. and 5.67 W. By adding together the above, and subtracting S. from N., we have N. .58 and W. 11.94 as their sum; and the problem becomes that of reducing these two directions to one, by the ordinary methods of trigonometry.



In the annexed figure, let *ab*, represent the *northing* = '58, and *bc*, the *westing*, = 11.94; it is required to find the supplement of the angle *c*, or the angle which the line *ca* makes with the dotted index line representing north and south, and the line *ca*, which is the amount or value of the resultant.

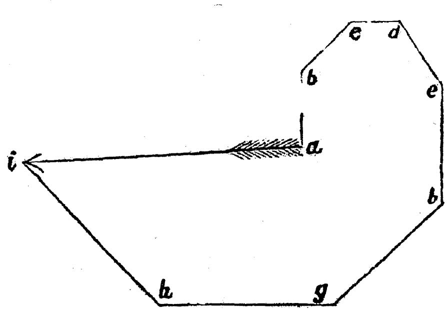
By drawing the arc *dg*, the sine *df*, and the tangent *eg*, we have from similar triangles, *cb* : *ba* : : *cg* : *ge*. This, when reduced, gives the northing divided by the westing = tangent of the course, which in this instance = N. 78° 22′ W. The proportion *df* : *cd* : : *ba* : *ca*, in a similar manner gives the northing divided by the sine of the course = the value of the resultant, which in this instance = 11.95 days.

* Winds of the Northern Hemisphere; Smithsonian Contributions to Knowledge, Vol. VI.

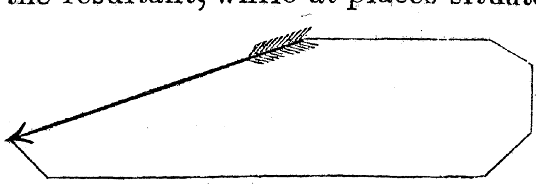
twenty-eight north, of that of the whole State, or a point S. 80 degrees W. Of these there were within

	5	degrees	of S. 80	degrees W.,	4	north	and 10	south.
	10	"	"		2	"	7	"
	15	"	"		6	"	8	"
	20	"	"		4	"	4	"
	25	"	"		5	"	1	"
	30	"	"		4	"	2	"
	35	"	"		0	"	1	"
	40	"	"		1	"	1	"
over	40	"	"		2	"	0	"

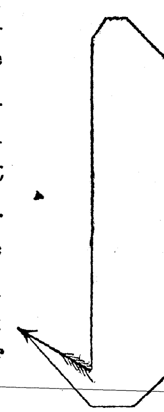
With a single exception, the mean directions are embraced within an arc of 111 degrees, 11 minutes, from S. 34 degrees W., to N. 34 degrees, 49 minutes W. The effect of a north and south valley, is to shorten very much the amount of the resultant, while that of an east and west valley is to lengthen it. This may be conveniently shown by diagrams.



If in the annexed figure, the lines *ab*, *bc*, *cd*, *de*, *ef*, *fg*, *gh*, *hi*, represent in direction and length the sum of all the winds that blow from the several points in a given month, the arrow *ia*, will represent the resultant of the winds, and the sum of the broken lines *ab*, *bc*, &c., to *i*, the entire period of the month. It is evident that the prevalence of northerly and southerly winds as at Kinderhook, would give the figure a vertical elongation and very much shorten the resultant, while at places situated like Utica, in an east and west valley, the elongation would be horizontal, and the resultant increased in quantity. The relative prevalence of winds may also be shown, and the modifying influences of local causes demonstrated, by laying off

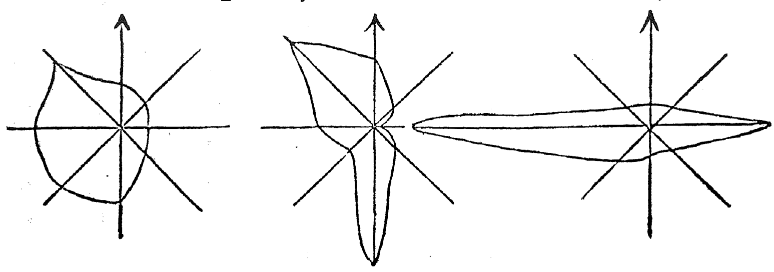


Winds at Utica.

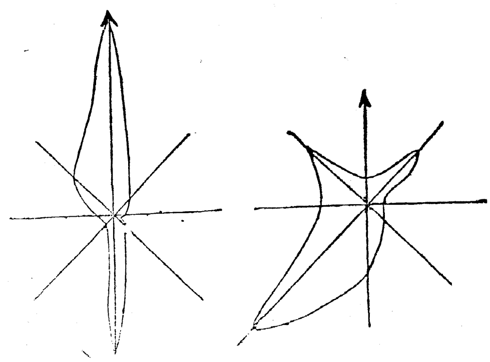


W'd at Kind'hook

from a central point, in different directions, distances proportioned to the prevalence of winds f'm the sev'al points and connecting the spaces thus laid off by a line, as shown by the annexed figures, in which the final results of the winds of the whole State, and of Albany, Utica, Kinderhook, and St. Lawrence are delineated. In general, the winds in this State, are more northerly in the first half of the year, and more southerly in the other half than the annual average, which in the memoir above cited, is attributed to the fact, that during the winter, the Atlantic ocean is warmer than the adjacent continents, and that necessarily there must be a tendency of the colder air from the land to the sea; while in the opposite season, the lands being warmer, the tendency of the winds is reversed. The winds of our latitude, therefore, in some degree partake of the character of the monsoons of the Indian ocean, although in a comparatively feeble degree. The winds of July, are generally coincident in direction with the annual mean.



Whole State. Albany. Utica.



Kinderhook. St. Lawrence.

Strongly marked physical features, extending over large areas, tend to produce regularity in the winds, and their relative humidity or dryness depends upon the nature of the surface over which they have passed. The progressive motion of winds is less in Europe than in this country, and from the change in relative position of sea and land, their character, as to humidity and dryness, is reversed. In France and England the most tedious and unpleasant rains are brought by west winds, and as these winds prevail, the relative amount of clear sky is much less than in this country.* In one hun-

* On our Pacific coast the prevalence of westerly trade winds gives a great uniformity to the temperature, and most of the rains come from that quarter. By passing up the slopes of the

dred showers which fell at Berlin, the different winds blew in the following proportions:

N.	N. E.	E.	S. E.	S.	S.W.	W.	N.W.
4.1	4.0	4.9	4.9	10.2	32.8	24.8	14.4

In the summer season, ocean winds may prevail for a longer time without rain than in winter, as they are not then so readily cooled down to the temperature at which rain is precipitated. It remains to be settled, by a long course of observation, how much the tendency to rain or drouth is varied from the primitive condition of a forest-covered country by cultivation, and how far the clearing up of these forests, the opening to the sun of marshes and low lands, may vary the rate of evaporation, or affect the precipitation of rain.

It has been often remarked, that springs and small streams diminish or disappear entirely as a country becomes settled; that extreme wet or dry seasons take the place of those more uniform, and that with a diminution of forests there follows a tendency to sudden floods and unusual drouth in rivers and brooks. This change, produced by cultivation, doubtless, has its limit, and the trifling changes which man can produce on the earth's surface must sink into insignificance when compared with the unchangeable features of nature. On this subject Dove has beautifully remarked:

"The natural inference from all this is, that with increased cultivation of the country, when all material for combustion has to be sought under the earth, the continually increasing population of the earth, in its effort to maintain itself, will plant in nature the germ of a period of death, when vapors shall no more condense into clouds over the treeless earth, and even the seed in the soil, refreshed only by dew, will lose its power of budding, or, if it should shoot up, would slowly wither and die. But the world, as well as the whole universe, is so ruled as to bear within itself both a principle of destruction and of preservation: it is thus—in the petty earth which we inhabit. No matter what changes may affect the outer surface of the earth, the permanent remains permanent, and the changeable changeable; for what, in proportion to the great

Rocky mountains, the moisture gets condensed, so that to the eastward the west winds are dry. It has been well remarked of the northern Atlantic States: "So long as the westerly winds continue to blow in winter there is no cessation of your cold, and so long as it continues to blow in a broad regular stream in summer there is no end to your drouth."—ROBERT RUSSELL'S *Lecture before Smithsonian Institution,* 9th Rep., S. I, p. 196.

features of sea and land, are the trifling changes of drained lakes and dried up ponds? If the sun stands over the southern hemisphere with its broad waters, there will then be a greater extent touched by the warmth thus created, than if it beam in northerly limits over a broad solid surface. The vapors with which the atmosphere becomes charged in excess, between the autumn and the spring equinoxes in the southern hemisphere, return in the other half year back to the earth in the shape of snow and rain, and in excess, over the northern hemisphere."

The extreme drouth of the summer of 1854, and the excess of rains in 1855, in our State, afford a striking example of the inequality of distribution of rains to which we may become liable, while the total results of a long series of years would show no material change. This inconvenience will be less with us than in the north-western States, from our greater exposure to the precipitation of vapors from the sea. Boussingault has shown, that in South America the springs that had dried up in the settlements, returned as the forests won back the ground, abandoned by the colonists on account of the revolutions, and in a like proportion the rains again became more frequent.

If, as suggested by Dove, the cultivation of ten years by the French in Algiers has added more than one rainy day to July, it may not be deemed improper to inquire, whether the ornamenting of rural dwellings and the public roads with shade trees, may not have a salutary influence upon climate, by tending to equalize the fall of rain. In many instances the inconvenience of drouth in rivers and streams may be cheaply avoided, by the retention of the excess of winter rains in natural reservoirs, enlarged by the building of barriers across their outlets. The opposite extremes of flood and drouth would be then avoided, and calculation has shown even the possibility of maintaining the navigation of the Ohio river in the dryest seasons by the aid of these artificial supplies, retained from the spring flood.

Observations upon the *Aurora borealis* show that this phenomenon appeared on 1,152 days in the entire period—or about 46 days in each year. They were distributed according to the following table.

TABLE *showing the distribution of Auroras through the several years and months.*

YEARS.	January.	Febru'ry.	March.	April.	May.	June.	July.	August.	Septem'r.	October.	Novem'r.	Decem'r.	Total.
1826,										2			2
1827,	1			2				5	3	1	1	1	14
1828,	3	2		2			1	2	6	3	1	1	21
1829,	3			3	2	5		2	3	3	1	2	24
1830,	1	4	4	5	10	7	5	12	8	14	4	5	80
1831,	3	4	15	6	2	8	11	1	1	3		1	55
1832,	1		2	5	3	3		4	3	2	1		24
1833,	1		2	3	4	2	3	3	10	6	1	2	37
1834,	3	2	6	2	1		2	2	1	8	2	6	35
1835,	5	3	2	1		2	2	2	7	1	4	1	30
1836,		2	1	9	4	10	10	11	3	4	6	1	61
1837,	4	2	6	6	3	3	5	5	8	2	5	1	50
1838,	5	4		4	1	3	4	3	10	1	4	3	42
1839,	9	3	5	7	8	2	2	6	6	5	3	1	57
1840,	6	5	7	10	9	3	3	9	5	6	5	5	73
1841,	2	17	9	6	5	2	8	12	5	5	6	1	73
1842,	3	3	2	6		3	6	1	3	2	4	2	35
1843,	4	8	5	8	3	7	7	3	6	5			56
1844,	1	1	5	3	5	1	1	1	4	3	4	1	30
1845,	3	3		3	1		3	5	2	2	1	1	24
1846,	2		1	5	9	2	3	6	8	5	2	4	47
1847,	2	1	9	7	3	1	3	3	3	2	8	4	46
1848,	8	12	8	9	3	3	6	5	1	7	6	5	73
1849,	4	8	8	8		5	6	5	12	10	1	6	73
1850,	1	7	9	5	7	7	9	14	13	8	4	6	90
Total,	76	86	106	125	83	79	100	122	131	110	74	60	1, 152

This table indicates a progressive increase in the frequency of auroras from December to April, a decrease in May and June, and the greatest frequency in September. The number in different years is found to vary considerably, having been remarkably frequent in 1830, 1840, 1848, 1849 and 1850, and more seldom seen in 1828, 1829, 1832, 1835, 1844 and 1845. In the work quoted at the beginning of this article, there is given a comparative list of days on which auroras were simultaneously observed at numerous places besides the State of New-York, and the facts thus collated, show, in a remarkable manner, the truth of the statement that has often been made, that conditions favorable to the formation of auroras may simultaneously exist over an immense area, and that they may appear at places thousands of miles apart at the same moment.

Auroras were noticed on the same days in this State and in Europe on 160 occasions, and if special observations has been made, and clouds had not prevented them from being visible, the number would, without doubt, have been found much greater. Auroras are more common in the north part of the State, and at times they have appeared with a magnificence and splendor beyond the power of language to describe or pencil to paint; glowing with scarlet and crimson hues, and covering the heavens with a drapery of dazzling splendor. The appearance of the aurora may be classified as follows:

1. A steady glow on the northern horizon, like the dawn of morning.

2. A more elevated and diffused light, like an arch with a dark segment beneath.

3. Detached masses of light, often flashing and flickering.

4. Streams, usually springing up from an arch, but sometimes starting up in space with a rapid vertical motion, and often with a lateral one.

5. Coronæ of converging streamers in the magnetic zenith.

6. Bands of light shooting up from the east and west to the zenith, often with a serpentine motion, or appearing to be composed of bundles of rays transverse or oblique to the direction of the arch. These bands usually subside slowly towards the south, and at times form a southern arch.

7. Curtains of light, slowly waving like a flag, at times appearing in a series of several, and at other times single; occasionally extended in right lines to immense distances, but commonly more or less curved, or encircling the zenith. This

last appearance, as observed by the writer on Sept. 6, 1851, presented a spectacle of grandeur without a parallel.

Through the densest light of auroras the stars are readily seen, and even in the dark segment under the arch, proving that neither are clouds. The disturbance in magnetic and electrical conditions that have been noticed to attend auroras, more especially those presenting a flashing and rapid movement, lead to the belief that they may be caused by these agencies, although a knowledge of the manner of their formation, and the general laws which govern them, remain to reward future observation and discovery.

A knowledge of the periodical and secular changes of terrestrial magnetism, from its relation to practical surveying and the boundaries of land, has a direct claim upon our attention, and at an early day the Regents called the attention of their meteorological observers to the importance of carefully ascertaining from time to time the variation of the magnetic needle from the true north. Concise directions were given for ascertaining the azimuth of the magnetic meridian by observations upon the pole star, and about fifty records of this class were reported. In every instance in this State the variation of the needle has been found to be west of north, the amount being greater in the eastern part of the State than at the west, but the rate of decrease as we go westward is far from being uniform.

This variation is known to be subject to daily, annual and secular changes, and the laws by which it is governed can only be determined by long series of observations at numerous places. The line of no variation at present crosses lake Erie, and is travelling slowly westward. The variation has changed at Albany in the space of nineteen years as follows:

1817,....	5°44′ W.	May 5, 1831,.....	6°25′ W.
Augt. 1, 1818,....	5 55	Nov. 5, 1841,.....	6 40
April 24, 1825,....	6 00	Oct. 1, 1834,.....	6 40
Sept. 20, 1828,....	6 18	Oct. 29, 1836,.....	6 47
June, 14, 1830,....	6 18	Nov. 1847,.....	7 35

The extremes of eastern and western variation, and the time required to accomplish a vibration between these extremes, has not yet been determined. The practice of noting the bearings of lines in land surveying by the magnetic needle without reference to its variation from the true meridian, has been a constant source of inconvenience and perplexity, which in-

creases with the lapse of time between different surveys. The importance of this subject should lead to the determination of the true meridian at one or more places in each county of the State, and its preservation by permanent monuments, at which local surveyors might be able to determine very nearly the variation, for the purpose of noting in their surveys.

The limits of this article will not admit of an account of phenomena of an unusual character, which were at times reported to the Regents, in the course of the observations under consideration, or a classification of the results of the progress of vegetation, and other changes dependant upon the relative lateness or forwardness of the seasons. Of the former were notices of unusual atmospheric refractions, tornadoes, earthquake shocks, destructive floods and storms, and similar striking and unusual phenomena, and of the latter, the foliation and blossoming of plants, ripening of fruits, and other events of similar character, by which we are accustomed to note the progress of the season. These last named are for the most part so intimately related to the temperature, and presence or absence of rains, that a series of tables of the latter would afford a reliable means of determining their character.

It is highly probable that the changes consequent upon clearing up of the forests, and bringing under cultivation a great part of the State within this century, may have produced permanent changes of climate, and varied the mean time of occurrence of various phenomena. The Indian summer appears to be now less distinctly characterised than formerly, and the depth of snow in winter is believed to vary, one year with another, more now than in the days of our fathers. In many sections these changes, so far as affected by local causes, have nearly reached their limit, as no more forests remain to be leveled, and no more marshes to be drained.

By a continued and intelligent concert of observation, we may be able to determine the extent of influence which these artificial changes may have produced, the effect of cultivation in modifying climate, and the peculiarities which physical features may produce in it. When these become known we shall then be able to adapt our cultivation to the climate in such a manner that, although unable to control or modify it, we may profit by a knowledge of existing conditions, and be able to derive the greatest advantages attainable.